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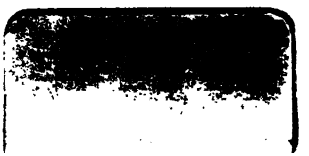

The Refractionist.

VOL. I.

A Monthly Journal of Practical Ophthalmology and Exponent of the Refraction World. Advocates the dissemination of scientific knowledge among the people, in reference to the care of their eyes. Urges the examination of the eyes of all children when entering school and at stated periods thereafter. Condemns the attempts of non-medical men, such as opticians, jewelers, etc., as dangerous in the extreme.

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THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I APRIL, 1894. No. 1

A FEW WORDS ON REFRACTION.*

BY G. MELVILLE BLACK, M. D., DENVER, COLORADO.
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THAT a great change has taken place during the past twenty years as to where people procure their glasses is only too apparent. An oculist was only consulted in extreme cases. A makeshift was obtained from their jeweler. The correction of errors of refraction in children was rarely ever attended to. It was an exceptional thing to see a person under thirty wearing glasses, except for the correction of myopia. Glasses were indicative of age, and the youth had an idea that wrinkles soon appeared after wearing glasses.

What has occasioned the revolution that presents to us an army of young people wearing glasses who a few years ago would never have thought of such a thing? Are the eyes of the rising generation weaker than those of their parents? Is the visual acuity of our race deteriorating? I think we can safely answer the above questions in the negative. There must be some cause for it, however, and it no doubt lies in the fact that, fifteen or twenty years ago oculists in the United States were few in number, and located only in the large cities. The graduate in medicine received his diploma to practice without knowing anything about the eye and the many reflex diseases which are caused by it. The little body of oculists in Boston, New York and Philadelphia who fought bravely on for recognition, soon occupied chairs of clinical ophthalmology in the leading schools, but as no examination was required on their branch for graduation, the newly

* Read before the Denver and Arapahoe Medical Society, December 26, 1893.

made physician went out into the world as ingorant about the eye as his preceptor. It is only within the last few years that examinations have been required in ophthalmology for graduation. Post-graduate schools have led in this work; thousands of medical men have appreciated the necessity of knowing something more about this organ and have taken special courses in this branch. The medical journals have teemed with articles showing the importance of eye strain in relation to the general nervous system. Physicians limiting their practice to the eye have sprung up all over the country, until now hardly a town of 10,000 inhabitants can be found but what can boast of one or more oculists.

A certain amount of knowledge about the eye has been forced upon the general practitioner no matter how much he has shunned it, until he is only too glad to get rid of his rebellious cases of headache by turning them over to the oculist who has just come to town, and must be able to do something for them. The latter appreciates his position as the *dernier resort*, prescribes a handsome pair of gold-rimmed spectacles, clips a muscle or so, and of course, the patient is cured(?).

That this ophthalmological era has been to a certain extent productive of good, there is no question, for out of the great number of oculists that have sprung into existence within the last ten years, there are a great many who are intelligent men who have at heart the welfare of their patients and are not in it purely for gold. Many others, I am sorry to say, are not so considerate, and have only their selfish ends in view, and do not feel that they have done themselves justice until an expensive pair of glasses has been adjusted and the fee collected.

The craze for spectacles has not been the result of the oculist's labor alone, but has been augmented by the efforts of the optician who travels about from town to town, or locates at some point, and by his advertisements attracts to him a great number of people who are convinced by his advertisements that they have an eye trouble. None of them escape without receiving from him one to three pairs of glasses.

With the rapid progress of ophthalmology the laymen have not been idle. They have been educated to know that certain well known symptoms are indicative of eye strain and apply to the oculist or optician for an examination. Hence it is that so many, both old and young, are wearing glasses. We now find that the young peo-

ple do not object seriously to wearing glasses when the necessity for their refraction being corrected is explained to them.

Look at it as we may, glasses are not pleasant things to wear, and unless they are especially indicated should never be prescribed. I am satisfied that an unnecessarily large number of people are wearing glasses. In my opinion a spherical glass of .50 D or a cylinder of .25 D either plus or minus is rarely ever indicated to be worn for distance, and yet how frequently we see them worn. Frequently some one publishes cases in which these very weak glasses have apparently relieved some of the most remarkable symptoms. I have yet a case to report in which the prescribing of such weak lenses has been of any value. Cases of apparent asthenopia in which only a half dioptry spherical error or one-fourth dioptry cylindrical error exists without muscular insufficiency will not be relieved by wearing glasses and must be due to some other cause and treated accordingly.

We also find a large number of minus sphericals of weak refractive power prescribed, and upon paralyzing the accommodation a plus refraction becomes manifest. I am glad to report that this error is usually made by some vender of glasses who has not the right to use a cycloplegic by virtue of his not being a graduate in medicine.

The question *when it is necessary to use a cycloplegic* has been one of some contention for some time past; all I can offer is my method of procedure. I have almost discarded atropine as a cycloplegic in refraction work. Homatropine does all that I can ask for. The most efficient and convenient preparation is ophthalmic discs composed of 1-50 grs. each of the alkaloids homatropine and cocaine. One of these discs is placed under the upper lid of each eye, and the patient told to close the lids and keep them closed for thirty minutes, then the procedure is repeated and at the end of the hour the accommodation will be found to be in complete abeyance. I have met with but three or four cases of failure, and in each of these atropine had but little more effect until it had been used several times a day for a week or more.

With patients under the age of seventeen years, I invariably use homatropine, examining the eye at this sitting, then give a second examination about three or four days later when the accommodation has returned, and order as much as they will accept of the correction found under homatropine if plus refraction. If minus refraction I usually subtract from .25 to .50 D from the homatropine correction.

With patients from twenty to forty years of age I test with the intention of completing the examination at one sitting. By the use of the ophthalmometer, retinoscopy, the ophthalmoscope and trial glasses I can satisfy myself as to the exact state of the refraction in about one-third of such cases, and prescribe glasses if indicated. In the other two-thirds, if they do not accept the glasses I think they should as indicated by the ophthalmometer, retinoscopy and ophthalmoscope, I have them returned on the following day and use homatropine, when the same routine is gone through with. A third test is made a few days later, when the accommodation has returned, and if necessary their errors corrected.

It is very rare that a cycloplegic is indicated in patients over forty years of age.

Our precept should be to complete our examinations in the shortest time possible to do our patients and ourselves justice.

It is to be hoped that at some future time we will get legislation throughout the United States placing the prescribing of glasses entirely within the domain of the medical profession and that any other person who presumes to do so lays himself open to a suit for malpractice equally as much as if he had attempted to set a fractured limb.

ANISOMETROPIA.

By CHAS. F. BASSETT, M. D.
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PERHAPS no problems undertaken by the specialist require greater mental acumen than cases of anisometropia. Various faculties must be brought into play; accurate knowledge, wide experience, natural intuition, may sometime fail to surmount the difficulties presented in the selection of proper correcting lenses.

To aid in this work the following rules have been formulated:

I. When one eye is normal, and no eye-strain is perceptible, make no correction.

II. Select for both eyes the lens which corrects the eye habitually used.

III. Give the full correction for both eyes in the lesser differences in refraction.

IV. Give the full correction for both eyes whatever the difference in refraction.

V. When one eye is myopic and the other normal, correct the myopia.

VI. When one eye is myopic and the other slightly hyperopic, correct both errors.

VII. When one eye is myopic and the other hyperopic to a great degree, correct the myopia, order a plane glass for the other eye, and then make the full correction for the hyperopia after the glasses have been used for a time.

VIII. When both eyes are myopic, prescribe for each eye the lens which corrects the lesser error.

IX. When both eyes are myopic, give the proper glass for the lesser error and a partial correction for the greater, making the full correction after these have been used for some months.

X. When both eyes are hyperopic or astigmatic, give the proper glass for the lesser error, and a partial correction for the greater, making the full correction after these have been used for some weeks.

XI. Leave the decision to the sensations of the patient.

The last rule may be considered applicable to nearly every case, for the acuteness of vision and the comfort of the wearer form decisive criteria for determining the usefulness of the prescription.

Not all cases can be benefitted by correcting the error, however careful the correction may be made. The reasons for this may lie in one or more of the following conditions:

a. Mental incapacity for true binocular vision.

b. Amblyopia.

c. Paresis of accommodation.

d. Heterophoria.

To illustrate some of the foregoing points, the following cases are presented:

I. Miss Wilson, 23 years of age, presented herself on July 11, 1885, for relief from a sharp, continuous pain in the left eye. She also complained of a burning in the inner canthus of the left eye and a feeling in both eyes as if they were full of sticks. She also had a dull aching in superciliary region; the eyes were worse after sleeping, or using them for near work. The history of pain went back five and a half years to the time when she worked early and late upon a tidy with colored worsteds. While engaged in this occupation, she had rubbed some of the color from the skeins into her eyes so that they had become highly inflamed, and there had been a profuse discharge. A few months before she had been examined by an expert, who prescribed +1. for each eye. The pain, the burning and the blurring all continued without mitigation, while using these glasses.

This was the record of her vision:

$\frac{20}{30}$ O.D. $\frac{20}{100}$ O.S. With +1. V = $\frac{20}{20}$ O.D.
With +.75 ⊂ +4. cyl., axis 90°, V. = $\frac{20}{40}$ O.S.

An examination under full atropine mydriasis gave the following results:

With +1. V = $\frac{20}{20}$ O.D. With +4.50 cyl., axis 95° V = $\frac{20}{30}$ O.S.

This combination was given for constant use, and the mydriatic continued for four weeks. At the end of six weeks, January 26, she reported that her eyes were much improved; that she had not been so free from pain for years and that she could read several hours in the day, the only feeling of discomfort being a sensation of sand in the eye, and this was present only in the morning. A collyrium of boric acid and continuous use of the glasses soon caused all adverse symptoms to disappear.

II. June 10, 1890. D. C., Jr., 25 years old, was fitted with glasses in 1883 by a specialist, but the lenses became uncomfortable after a time, and in the spring of 1890 he was refitted. The last prescription was: —.50 O.S. —1.25 cyl., axis 90° O.D., but with

these the eyes ache all the time and are much worse on close application; the lids are red and stick together in the morning.

After a careful examination without atropia the following lenses were prescribed: —50 O.S. —50 ⊂ —1. cyl., axis 75° O.D., and they gave complete comfort for all work. In this case a slight change in the refraction of one lens, and the revolution of the axis through 15°, in combination with a careful attention to the universal rule, (XI) gave satisfactory results.

III. November 15, 1890. Robert G., 17 years old, a student, has had trouble with vision for some time and noticed that it was growing worse in the last few weeks. He had ulceration of the left cornea when three years old, leaving a nebulous condition, discernible with oblique illumination. V = $\frac{20}{100}$ O.D. V = $\frac{20}{200}$ O.S. With —2. V = $\frac{20}{30}$ O.S. With +.75 ⊂ —2. cyl., axis 180° V = $\frac{20}{70}$ O.D. As vacation was near at hand, he was allowed to continue in school until that time. On December 23, under the cycloplegic effect of atropia sulph. his refraction was as follows: V = $\frac{20}{200}$ O.D. With + 2.75 cyl., ax. 95° ⊂ —1. cyl., ax. 180° V = $\frac{20}{30}$. V = $\frac{20}{200}$ O.S. With —1. ⊂ —1. cyl., ax. 10° V = $\frac{20}{20}$. The above combination was prescribed and worn with amelioration of all outward symptoms until the following year. On November 24, 1891, this patient reported that for a month past his glasses had given pain and his vision was not so good as formerly. On November 28, under atropia, the refraction was found to be: V. = $\frac{20}{200}$ *o. u.* This corresponded with the condition as noted in December, 1890. With —1. ⊂ —1. cyl., ax. 10° V = $\frac{20}{20}$ O.S. This also corresponded with the correction of a year ago. But, with +2.75 cyl., axis 105° ⊂ —1. cyl., axis 180° V = $\frac{20}{30}$ O.D. This slight change in the direction of the axis, as in case II, seemed to clear up the difficulty, and the lenses have been worn with comfort since that time.

One important point that should be noted in connection with this case is the manner of constructing the lenses with crossed axis. In the first instance the eye was supplied with a glass having the combination ground upon the same piece. In the second prescription it was designated that the lenses of the right eye should be two plano-cylindrical pieces, and it is probable that the more accurate adjustment of the axial angles thus made possible constituted no small factor in the successful adjustment of the correcting glass.

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M.D., Editor.
74 Boylston Street, Boston.

To contributors of Original Articles, a liberal number of copies of the REFRACTIONIST will be given (or mailed free of expense if addresses are furnished), and reprints will be furnished at cost, if application for same is made when copy is forwarded. All articles for publication should be typewritten.
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Greeting. That there is no medical journal published devoted mainly to refraction work is sufficient reason for the appearance of this journal. The greater part of an oculist's work (nine-tenths stated by some) is the correction of Errors of Refraction. The great improvement in appliances for the detection and correction of such errors has been accomplished in the last half of the present century, and has been the direct results of physician's efforts. A journal of this kind should be useful in many ways.

First and foremost as a means of disseminating scientific knowledge. Although much has been done in the past the field has not been exhausted. The rapid increase of physicians in the last decade who are becoming proficient in refraction work is indicative of the changes in the near future. Ten years ago there were oculists only in our large cities. Now we find them reaching out into our larger towns and wisely too, for every center of 15,000 population contains in itself a good support for such a physician. In the next place a journal of this character should counteract the tendency to separate this branch of medicine and give it over to a class of people, wholly outside the profession, who in their ignorance claim that it no more belongs to medicine than dentistry does.

It remains with physicians to so educate their patients, that, when they need glasses they will no sooner go to the optician or jeweller for relief than they would to the blacksmith to be treated for spinal curvature or bow legs. Refraction errors should be considered strictly in the physician's realm, and any physician who advises his patients otherwise should be judged as displaying unnecessary ignorance.

Trusting that we may have the co-operation and aid of not only those interested in this line of work but of all physicians, we present this journal to the profession.

Some words on the Moypia Question.

It can no longer be doubted that myopia is a condition found, practically speaking, only in civilized man. The dawning of this truth upon the ophthalmological world has brought to light a number of theories as to the reason of this relation. It is, indeed a question of tremendous importance, especially in those countries, such as Germany, where the ratio of myopes to the general population is already large and is constantly increasing, threatening to eventually render the whole race short-sighted.

It is not our present purpose to discuss the anatomical theories of myopia, such as its dependence on the shape of the orbit, as held by Stilling, or on the shortness of the optic nerve, as maintained by Hasner and Weis, or even those views which attribute it to pathological processes dependent on prolonged accommodation or convergence. These theories, singly or combined, or similar theory, may be held to account for the great number of cases of acquired myopia. However, if myopia is caused solely by the strain of near work to an eye possessing certain peculiarities, no matter which, the doing of near work becomes an essential factor in myopia according to that theory. In short, these theories can be held as sufficient for "school myopia" only, and indeed the application of Stilling's theory is thus restricted by its author. That myopia does occasionally develop in those who have never done near work, that there is, in fact, a "typical" or "developmental" myopia has always been a stumbling block to the completion of any theory as to its origin which shall account for all cases.

It is not necessary to our purpose to discuss the clinical or logical wisdom of dividing myopia into two classes: a school myopia and a typical or essential myopia. Granting the existence of the latter condition we wish to call attention merely to its interpretation.

Those who look upon myopia as necessarily involving pathological changes regard these cases as pathological notwithstanding the perfection of their function and the absence of visible pathological change, Others, notably Cohn and Landolt, being convinced that these cases are not due to civilized pursuits, but to something inherent in the individual, have elucidated the theory that they are the evidence of the development of the human eye to fit it for civilized requirements. Landolt says: "I mean to say in a general way the tendency to myopia may be regarded as a phenomenon of adaption to the exigencies of the development of the species." Landolt directly repudiates any claim that the myopic eye is more nearly perfect in any way

than the hyperopic or emmetropic one: that its refractive surfaces are more regular or better centered, the accommodation more vigorous, the retina more sensitive or the motor apparatus more powerful or more supple. He therefore regards the myopic eye as bearing the imprint of a forced evolution; as being the type of hypertrophy rather than of perfection.

There is something paradoxical in the idea that a race is to attain to perfect adaptation to its surroundings by passing its inheritance through individuals who are admitedly less perfectly adapted to those surroundings than are their fellows. Moreover, a much simpler explanation of the facts is available. In the first place, myopia cannot exist or be propagated by inheritance in perfectly savage man or wild animal because it entails poor sight, and perfect sight is necessary to protect the lives of creatures in these states. One can readily see how the possession of even a half diopter of myopia would severely handicap a savage in his daily struggle for existence. It is safe to conclude that such individuals as developed this peculiarits would be promptly eliminated by death before they had time to propagate their like. This is the essence of evolution by the survival of the fittest and its activity in this particular instance cannot well be doubted.

In order to account for the appearance of myopia with civilization it is not necessary to assume that civilized pursuits are directly or entirely responsible therefore. It is sufficient to show that civilization protects the myope and allows him to live out his natural period of life and to reproduce his like, while in a savage state, his term of life and consequent chances of offspring are, on account of his peculiarity, less than those of the hyperope or emmetrope. Such is evidently the fact. The natural variation of individuals of the same species, as the studies of the evolutionists show, is abundantly able to account for the primary appearance of myopia in a species. If not eradicated, or if, as in modern life, placed by means of glasses on an equal footing with the other states of refraction, there is nothing to stop its propagation.

The myopic eye, therefore, far from representing the improvement of the race or its adaptation to higher pursuits, represents, as we may say, the survival of the unfit. A survival due entirely to the protection afforded by civilization of the myopic defect by glasses. That the individual thus saved from destruction is more ideally perfect, or more nearly fitted to his surroundings than his hyperopic or emmetropic brother who can dispense with both civilization and glasses, does not seem indicated. — R. J. PHILLIPS, M.D., Phila.

The Quarter Dioptry Cylinder. Some time ago the attention of the profession was called to the value of the quarter dioptry cylinder, in cases of asthenopia, by Dr. Chisholm of Baltimore, and since its value was made public by so distinguished an authority many hundreds of cylinders of this strength have been prescribed by oculists in this country, with marked relief to their patient. I wish to add my testimony in favor of this weak cylinder, and by a few cases taken from my private case books show the help that I have derived from its use in the class of cases for which it was first recommended—painful eye sight for near work, in patients having perfect distant vision.

I have prescribed a number of these cylinders in the last few years, and am now ordering them with greater frequency and with greater confidence than at first. In looking over my records I find that the great majority of cases that have been helped by these weak lenses have been cases where the astigmatism has been against the rule. In these cases the initiation and discomfort arising from .25 D. of uncorrected astigmatism is greater than several times that amount of uncorrected astigmatism with the rule. In an editorial appearing in the Journal of the *American Medical Association*, February 3, 1894, the writer under the heading of "Superfluous Spectacles" seems to doubt the benefits that are being derived from the use of this weak cylinder, for in the eight paragraphs of the article the writer states " . . . . while again .75 D. represents the lowest cylindrical lens which is ordinarily of benefit, cases do occur beyond doubt in which half a dioptry of astigmatism leads to discomfort or headache. Such cases, however, are exceptional and occur as a rule only when the general health is below par. It is true that a cylinder of .25 D. is not only employed but even highly recommended by a few prominent oculists, but they have as yet furnished no proof that such lenses benefit their patients. The majority of oculists have learned from their own experiences, as well as from the failures of the champions of the .25 D. cylinder, that such glasses are of mythical value."

Again, "But does every optic defect need correction, and is every case of paniful vision curable by glasses?" Of course every optic defect does not need correction, but optic defects troublesome enough to send patients to the oculist need correction in the majority of cases, and if we know from past experience that cases of this nature have been relieved and enabled to resume the eye work by means of

.25 D. cylinder, shall we not prescribe this lens in proper cases? Of course every case of painful vision is not curable by glasses, as an *optician*, but not an *educated oculist*, might suppose. If the profession at large and the laity would remember that patients do not often consult the oculist until they are conscious of some difficulty with their vision, less often would this prescribing of spectacles by oculists be a matter of self reproach.

I append the clinical history of ten cases occuring in my private practice when I have prescribed the .25 D. cylinder with satisfaction both to my patients and myself.

Case I. Dr. P., physician, 38, for years eyes have been injected, painful on using, and the use greatly limited. V.O.D.=$\frac{6}{9}$, with—.25 90°=$\frac{6}{6}$. V.O.S.=$\frac{6}{6}$ with +.25 180°=$\frac{6}{6}$+. When this correction was made, the patient immediately volunteered the statement that "the eyes feel cool, as if they were bathed in cold water." Used continuously for distant and near work with great relief.

Case II. Miss C., scholar, 19, eyes have been painful for a year or more; cannot use eyes for any length of time. V.O.D.=$\frac{6}{9}$, with —25 90°=$\frac{6}{5}$. V.O.S.=$\frac{6}{6}$, with—25 90°=$\frac{6}{5}$. By using these glasses continuously is enabled to go on with her studies.

Case III. Mr. N., book keeper, 26, for years left eye has been injected, and on using eyes more than usual develops an acute conjunctivitis in this eye. Treated patient carefully with astringent lotions but with only temporary relief. V.O.D.=$\frac{6}{6}$+, V.O.S.=$\frac{6}{6}$—, with +.25 180°=$\frac{6}{6}$+. Ordered this glass with +.25 spherical for right eye, with total relief to left eye.

Case IV. Miss S., 23, has never seen with right eye enough to be of any use to her; left eye does all the work. For the last six months has had sense of discomfort on reading, no bluring of letters. V.O.D.=$\frac{4}{60}$ no improvement with glasses. V.O.S.=$\frac{6}{6}$, with +.25 180°=$\frac{6}{5}$. Prescribed this glass for constant use, gives so much satisfaction that on losing glasses a year afterwards patient applies for another pair.

Case V. Mr. F., student, 21, eyes have been troubling him for a year after using them for an hour or so especially at night, eyes seem inflamed and lids heavy, V.O.D.=$\frac{6}{6}$, with —.25 90°=$\frac{6}{6}$+. V.O.S.=$\frac{6}{6}$, with—.25 90°=$\frac{6}{6}$+. After using these glasses for over a year finds no need of a change.

Case VI. Mrs.—, 42, subject to headaches, for the last few years has not been able to use eyes much. V.O.D.=$\frac{6}{6}$, with +.25 75°=$\frac{6}{6}$+.

V.O.S. = $\frac{6}{6}$, with + .25 105° = $\frac{6}{6}$ +. Uses these glasses for both distant and near work, returns after some months expressing great satisfaction and wanting a segment cemented on her glasses for near work.

Case VII. Mrs. A., 48, subject to headaches, has not used her eyes for the past year, V.O.D. = $\frac{6}{6}$ —, with + .25 90° = $\frac{6}{6}$ +. V.O.S. = $\frac{6}{6}$, with — .25 180° = $\frac{6}{6}$ +. Uses these glasses for distance; has had them replaced twice.

Case VIII. Mr. H., student, 21, eyes pain him on using them in the evening; has had to give up college not being able to do all of his work in the day time. V.O.D. = $\frac{6}{6}$, with + .25 180° = $\frac{6}{6}$ +. V.O.S. = $\frac{6}{6}$, with + .25 180° = $\frac{6}{6}$ +. By the use of these glasses was able to resume his studies.

Case IX. Mr. R., mechanic, 32, has a sense of discomfort about the eyes, V.O.D. = $\frac{6}{6}$, with + .25 90° = $\frac{6}{6}$ +. V.O.S. = $\frac{6}{6}$, with + .25 90° = $\frac{6}{5}$ Accepts glasses for constant use.

Case X. Miss. A., student, 18, eyes are not exactly painful but after applying herself to any near work for a short time, "realizes that she has eyes." V.O.D. = $\frac{6}{6}$ —, with — .25 90° = $\frac{6}{6}$. V.O.S. = $\frac{6}{6}$ —, with — .25 180° = $\frac{6}{5}$. Uses these glasses continuously.

A point in favor of the quarter dioptry cylinder in these cases is that the patient retains them through preference; patients are not often given to retaining glasses that give no help.

WILLIAM E. BAXTER, M.D., Bangor.

* * *

Transposing Lenses. Our attention has been called repeatedly to the prescriptions of well known oculists of which the following is a sample:

+1 D. ⊂ — .50 D. ax. 180° *o. u.*

Now why not write it as follows so as to get what one writes for, as the optician will certainly give it:

+ .50 D. ⊂ +.50 D. ax. 90° *o. u.*

In other words the optician will transfer the prescription into the simplest form if he understands his business. Is the reason because the oculist does not understand transposition or because he thinks he gets better results from the former than from the equivalent?

Refractionists Should Protect Themselves. Shall refractionists patronize those opticians (so called) who over step their field of work and usurp the work of the physicians. There are opticians who confine themselves strictly to executing the orders of the physician, and oculists who knowingly and willingly patronize those houses who do fitting are simply like Sisyphus rolling a stone that may return and crush them. Our advertising pages will not be open to this class of optical houses, and we rely on the profession to sustain us. We have already refused a number of this class some of whom have made extra offers for space. The accompanying quotation from a letter recently received is a sample of what we are receiving from physicians of whom we have made inquiries in reference to the status of applicants for space:

"My Dear Doctor:

Yours of yesterday received. ———, about whom you ask, are notorious in this town for the way in which they pretend to examine eyes. They send men about the country to the small towns to do it, and advertise themselves as "oculists." So that they appear to be the type of people whose advertising you say you will not take. I admit that I am surprised to see you take such an advanced stand on the advertising question, because I did not suppose you would consider that you could make the journal a financial success without these advertisements. If you can get along without them I am glad a thousand times and am so much the more attached to The Refractionist. The fact that you do not take questionable ads. will be a strong argument with the best men, and I think will win valuable friends at once.

Yours for the success of The Refractionist,

———————"

* * *

The Trial Case. Many physicians who are amateurs in Refraction work and have not that confidence which results from contact with men of more experience are frequently puzzled just what to prescribe in certain cases. These columns will be open to physicians to aid them in any way in settling any doubtful point or to enable them to gain any desired information on refraction work. In sending for information fill out the following:

Age of patient—— V. R. V. L. State correction.

R.=No. J. at inches, with =No. J. at in.
L.= " " " " " " "

Test muscles carefully and note any deviation from normal, also state if mydriatic was used. Localize headaches if any, and give brief history of the case.

Clippings

Ophthalmia Neonatorum. A notable service has been done by Dr. H. D. Noyes of this city, in securing the enforcement of the law compelling midwives to report any cases of contagious diseases of the eyes, occuring in the newly born. Dr. Noyes followed up one such case, where the eyes had been culpably lost by the neglect of the midwife and the consequent want of treatment, and secured a trial and conviction, under the auspicies of the Society for the Prevention of Cruelty to Children.

It took a great deal of trouble and time on the part of this busy surgeon, to accomplish this end, but it has shown the authorities that there is such a law, that it can be enforced. If this idea gets thoroughly into the minds of the midwives, we shall save a great many children in this city from blindness every year. A circular will be issued by the Society for the Prevention of Cruelty to Children, prepared under the auspicies of the New York Ophthalmological Society, telling midwives just what to look out for in order to avoid serious consequences from the inflammation in babies' eyes.—*Post-Graduate, New York.*

* * *

Table. Showing the number of millimetres to decentre a spherical lens in order to add a prism of from 1° to 5°.

DIOPTRIES	1°	2°	3°	4°	5°
0.25	37.0	74.0	111.0	147.9	184.8
0.50	18.5	37.0	55.5	73.9	92.4
0.75	12.3	24.7	37.0	49.3	61.6
1.00	9.2	18.5	27.7	37.0	46.2
1.25	7.4	14.8	22.2	29.6	37.0
1.50	6.2	12.3	18.5	24.6	30.8
1.75	5.3	10.6	15.9	21.1	26.4
2.00	4.6	9.2	13.9	18.5	23.1
2.25	4.1	8.2	12.3	16.4	20.5
2.50	3.7	7.4	11.1	14.8	18.5
2.75	3.4	6.7	10.1	13.4	16.8
3.00	3.1	6.2	9.2	12.3	15.4
3.25	2.8	5.7	8.5	11.4	14.2
3.50	2.6	5.3	7.9	10.6	13.2
4.00	2.3	4.6	6.9	9.2	11.5
4.50	2.1	4.1	6.2	8.2	10.3
5.00	1.8	3.7	5.5	7.4	9.2
5.50	1.7	3.4	5.0	6.7	8.4
6.00	1.5	3.1	4.6	6.2	7.7

When to Operate for Squint. — E. Jackson M. D. (*International Medical Magazine*, February, 1894), in a careful consideration of the question of operations for strabismus, makes the following points:

No operation should be done so long as other methods of treatment offer any probable chance of relief. The slow development of co-ordinating power in some children, and the possibilities of change by future development should prevent early operative interference; and, as a rule, therefore, operation should not be undertaken before the age of five or six years, and at that age complete correction by operation should rarely be attempted. At puberty complete correction of the squint by operation should be undertaken where it has been incompletely corrected or is of low degree. In adult life the existing indications govern the operation. In cases of squint due to ametropia the latter should be corrected before operation is attempted.

* * *

BOOK NOTICES.

ERRORS OF REFRACTION. A course of twelve lectures on the *Errors of Refraction* and their *correction* with glasses, delivered at the New York Post Graduate Medical School, with illustrative cases from practice, both private and clinical, by Francis Valk, M. D., Lecturer on the Diseases of the Eye, New York Post Graduates Medical School, Ophthalmologist to the New York Dispensary, etc., etc. Third edition. G. P. Putnam's Sons, New York and London, 1893. Price $3.

While this work contains but little that is new to the physician skilled in refraction work, it has much that is practical and of great interest to the general practitioner and physicians wishing to become proficient as refractionists. The author has endeavored to make the work plain so as to be easily understood, and has succeeded admirably. The work is profusely illustrated and the cuts in general have the appearance of not being inserted to advertise any particular optical house. "My instrument maker" is not the leading feature of the work. The diagrams of vertical and horizontal planes in astigmatism, figure 79 (first used by Knapp), are fine, and will be readily recognized by any one who has been under the instruction of either Dr. Valk or Fox. Lecture twelve, on the ophthalmometer is a marked feature of the work, as it contains more information on that valuable instrument then is found in other works on refraction. The work should be in every physician's library.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I MAY, 1894. No. 2

SOME OCULAR HEADACHES.

BY F. D. GREEN, M.D., PUEBLO, COLO.
Eye and Ear Surgeon to the Missouri Pacific Railroad, etc.

HEADACHES are perhaps the most frequent nervous symptoms presented to the ophthalmologist, but unlike some who have made the study of ophthalmology a specialty, I am unwilling to attribute the majority to ocular origin. While it cannot be doubted that many headaches are due to eye strain in uncorrected errors of refraction and others are due to heterophoria; still I am of the opinion if a careful examination is made of all cases applying to the ophthalmologist quite a respectable number will be found to have other origin; those with the reflex headaches from nasal disease and obstruction, from stomach and from uterine and rectal disorders, I think will amount to as many as those of ocular origin.

As yet I do not think reflex action in the cause of various nervous phenomena is thoroughly understood; but that irritation to the periphery may be carried to the center and thence reflected to some other organ and give rise to various phenomena is undoubted, for relief from the irritation causes relief from the phenomena.

I shall first take up some headaches due to ametropia. The constant strain on the ciliary muscle in its effort to maintain a distinct image on the retina in ametropia is an undoubted cause of reflex troubles among which headaches are frequent. These may vary as to location. In hypermetropia these are usually frontal but may be in the vertex. In astigmatism the pain may be located in the frontal region, in the vertex or in the occiput. My experience is that the latter is the most frequent seat.

Again in astigmatism I have met with migraine where the error

was of high degree. Headaches of ametropic origin occur most frequently in the most active period of life and among persons whose business requires continuous use of the eyes. They usually begin with a burning sensation in the eye, asthenopia, then headache.

That heterophoria is a frequent cause of headaches and some other nervous symptoms I cannot doubt, but that chorea, epilepsy and many cases of migraine are due to this cause I am as yet unwilling to admit. Headaches from this cause may be accompanied by asthenopia, and may be located in the occiput, vertex or frontal region.

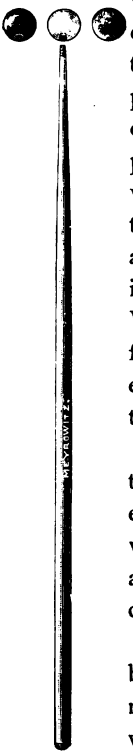
Are we to attribute all headaches met with in which there is ametropia or heterophoria to these causes? By no means. I make it a rule in all cases to examine the nose, and while I believe that all cases of ametropia and heterophoria should be corrected, I find many are due to nasal obstructions. My rule is never to pronounce a case ocular until I am thoroughly satisfied it is not due to other causes. To sum up:

1. Many cases of headache are due to ametropia.
2. Many cases are due to heterophoria.
3. Never pronounce a case as due to ocular strain until the nose is examined.
4. Inquire into the condition of the stomach.
5. In females inquire concerning the condition of the genitals and whether there is constipation.
6. Migraine may be due to ametropia or heterophoria, but frequently is not.

A BALL-CAPPED WAND FOR THE RAPID EXAMINATION OF THE VISUAL FIELD.

By JOHN HERBERT CLAIBORNE, M. D.
Adjunct Professor of Ophthalmology in the New York Polyclinic.

THE accompanying cut represents a wand of guttapercha on which a red, green or white ball may be screwed. It is intended as a means for facilitating the examination of the field of vision for white, green or red. It is a fact well appreciated that the ordinary examination for the field with the classical perimeter is tiresome in the extreme to both patient and surgeon. This is a disadvantage not to speak of the time expended. For examining the field in the press of office work or dispensary work the wand herewith presented saves much time and energy. It is better than a piece of paper or wool held in the jaws of a fixation forceps, for from whatever side the ball be viewed it is practically equivalent in relief to a plane surface. Whereas when a bit of paper is used it is quite possible for the surgeon in a moment of inadvertence to turn the edge of the paper toward the patient and in this way obtain incorrect results.



Of course one eye is closed and the patient is directed to fix some one feature in the surgeons face, such as one eye or the nose, and the ball is carried through the various diameters of the field. The red and green balls are intended particularly for the testing of the central color field in toxic amblyopia.

The taking of the field of vision is uncertain at the best and the writer has found as good results with this method as with the perimeter. It is questionable whether any two observers would find the same field in a given case. This instrument is peculiarly fitted for quickly finding scotomata in the field. The wand is 12 inches in length and the balls 3-8 of an inch in diameter. The balls are of brass and are covered with a thick layer of white, green or red paint.

No. 10 East 28th St., New York.

COMPOUND HYPEROPIC ASTIGMATISM WITH RELATIVELY OBLIQUE AXES.

By MATTHIAS L. FOSTER, M.D.
Assistant Surgeon Manhattan Eye and Ear Hospital.

IT is commonly accepted as an axiom that irregular astigmatism cannot be corrected and the vision improved by glasses. As a rule this is true, but we occasionally meet with a case where the astigmatic meridians cross each other at an acute angle and are susceptible to correction with crossed cylindric lenses. Although these cases are rare the possibility of their occurence should be remembered. The following case is an example.

C. W., aged 41, came to my office in January 1891, on account of pain and inability to use the sight. He had had a number of pairs of glasses, none of which had given relief. On that day I found the vision of the right eye $= \frac{20}{200}$. With $+3$. D. $\bigcirc +2$ D. axis $90° = \frac{20}{40}$. The left eye had a simple hypermetropia of 4.50 D. Atropine was prescribed and several examinations were made during the next three weeks with this constant result: R. V. $= \frac{10}{200}$. With $+3$ D. axis $60° \bigcirc +2$ D. axis $90° = \frac{20}{30}$. When the patient's eyes had thoroughly recovered from the effect of the atropine it was found that the above glass was accepted and comfortable. Several months later he reported that he was still wearing the glass with comfort.

The question arises, is this a case of regular or of irregular astigmatism? Most text books, as well as the National Medical Dictionary, state positively that in regular astigmatism the two principal meridians cross at right angles while all agree that in irregular astigmatism the refraction varies in different parts of the same meridian. In this case the refraction in all parts of the corrected meridians was the same, but they did not cross at right angles. With the ophthalmometer it is not extraordinary to find variations of a few degrees from a right angle in the crossing of the principal meridians in regular astigmatism, and Fuchs remarks that the principal meridians rarely intersect at an oblique angle. Hence I would be inclined to consider this case one of the regular form with remarkable relative obliquity of the principal meridians.

I did not possess an ophthalmometer at that time so I was unable to determine whether the astigmatism was wholly corneal or partly corneal and partly lenticular.

No 7 East 41st St., New York.

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M.D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Prescription Writing. The increase in the interest in ophthalmic work, especially refraction, for the last two decades should necessitate sharper distinction between the physician and the optician. Fifty years ago it would do for the physician to send the patient to the "man who grinds lenses" to try on every pair in the shop, but with the exact science to which refraction is reduced to-day it is inexcusable. Out of this chaos has gradually grown the exact science which the refractionist (physician) is supposed to have mastered. Out of the "man who grinds lenses" has developed a class (dangerous in their ignorance) who style themselves professors, scientific opticians, masters of optics and similar over-towering names by which they not only deceive themselves but do much injury to their victims. From month to month a new crop of these educated gentlemen, after a month's study in one of these schools (?) of optics, are thrown out on the unsuspecting public. They immediately enter the arena and cater for the support of physicians. Another class equally dangerous are those so called opticians who have "picked up" their knowledge (?) and while advertising in the journals, cars, etc., their wonderful ability to cure headaches and decide for their dupes whether they need consult an oculist, they are using every effort to secure the patronage of the profession. That a physician should write prescriptions for patients to take to this class of people is a sad commentary shall we say, on the degeneracy of our noble art. The "man who grinds lenses" is still in existence, and some of them give close attention to their work. This class should be patronized. Many of our leading oculists are finding ont the mistake they are making in writing prescriptions.

The question has been asked what should a physician do who has a large practice and does not want to supply his work? We say en-

gage an extra assistant and after instructing him properly in reference to the measurement of the patient's needs have him see that the work is properly provided. We know a number who are doing this and after paying the assistant have a balance left from this department of their work. One physician says "it is not ethical." He has our sympathy.

This method has numerous advantages: 1st.—It protects the physician's business. 2nd.—It encourages the optician (we use the term in its legitimate sense "the man who grinds lenses"). 3rd.—It discourages jeweler-optician work. 4th.—It gives the patient better satisfaction and neutralizes the prevailing idea that the physician is in league with the optician. 5th.—It is better for the purse of both patient and physician. We never could fathom the advantage financially of charging a patient $5.00 for a simple examination, writing them a prescription to take to certain parties who would charge them $10.00 for furnishing what the physician could supply for 25 per cent less, and still make as much as his fee. These are our views will the reader give us his.

* * *

Subscriptions. The number of subscriptions from physicians that have reached us at the present is indicative of the need of THE REFRACTIONIST. Scientific and practical articles are needed to make it a success. Will *you* send in a contribution? What may seem of little importance to you owing to its familiarity by daily use may be of much interest to some one less versed in ophthalmic work. The subscriptions from those outside the profession also indicates an interest in the work. One from an optical house in a distant city lead us to investigate their standing and later we hope to have the ads. of a number of such houses in our advertising columns. One from a "specialist in lenses" has with it the statement that he intends to enter a medical college this fall.

That is correct. We trust the writer will not cease till he has the degree of M. D. No one but a physician has any more right to tamper with an eye than with the stomach or heart.

* * *

Hints for Patients. One of the early numbers of THE REFRACTIONIST will be devoted to such information as every physician wishes his patients to know in reference to the care of the eyes, use of glasses, etc., etc. A large edition will be published and contributors will be supplied with copies for private distribution, provided number of copies wanted is specified when article is sent.

Curetting the Cornea. Curetting or scraping the cornea is an operation that is not frequently performed, and one that is seldom demanded, but with all I believe that it might be done much more frequently than it is. My experience has been limited, but so far I think the results have been sufficient to warrant a repetition of the operation, whenever the case presents itself.

Case I. Thomas C———, aged 48 years, painter by trade, consulted me during the month of May, 1893, concerning his eye. Some six weeks previous to his visit to me he had gotten some lime into his eye. At the time of the accident he called on his family physician, who prescribed oils, and the ordinary soothing washes that are used in such cases and received but little benefit from them, so far as relief from pain was concerned. When I first saw his eye there was much vascularity of the cornea, and great intolerance of light. After two months of the usual treatment of such cases there was still considerable vascularity of the cornea, with an opaque deposit of what appeared to be a *scale* of thin semi-transparent material of some kind, occupying about one-third of the entire surface of the cornea. This opacity was on the nasal side of the cornea, and the blood vessels in great numbers coursed from above downward to the margin of this opaque area. In the meantime the fellow eye had become very sensitive to light. On the 27th day of July, 1893, after the eye had been cocainized, I scraped the entire opaque mass from the cornea and also scraped the blood vessels into a sort of a pulp, completely disorganizing them. The eye was washed out with a solution of boracic acid, and dressed with a compress, and the patient was given a solution of the sulphate of atropia, and instructed to drop it into the eye often enough to relieve pain. On the following day there was considerable reaction, but on the third day all active inflammatory symptoms had subsided, and the patient said the eye felt much better. Improvement continued rapidly for some time and finally the opaque deposit made its appearance again, but over a much more limited area. The eye was cocainized again on the 8th day of September, 1893. On this occasion the after treatment was the same as in the first instance. Recovery was rapid from this time on and aside from the opacity, which is moderately dense the eye is perfectly well, and Mr. C. is at work every day, and says the eye is not the least sensitive.

Case II. Miss Annie ———, aged 18, of slight form, fair complexion and apparently of strumous diathesis. She had vascular

keratitis involving the entire right cornea. The treatment in her case was that usually pursued in such cases, and in addition to the local agents, constructives and good diet were pushed liberally, and after weeks of this routine treatment, and after most of the local agents used in such cases had proven valueless, and when it seemed that the eye was to be lost, I cocainized the cornea, and with a "Beers" cataract knife I scraped the entire surface of the cornea, and when I had finished, it looked as though it had been bathed in a bloody pulp which in truth was a fact for I had broken up the entire mass of blood vessels and mixed them up with the corneal epithelium. This eye was washed out with boracic acid and compress put on. The reaction in this case had all pretty well subsided by the third day and improvement was rapid for a time, when it was necessary to do a second curetting. The results of this curetting were good. But a third operation was necessary before recovery was complete. The eye has now been well for months and vision is sufficient in it to enable the girl to do course work.

Commentary. In this case I believe that the eye would have been lost if the curetting had not been done, for all other efforts seemed to do no good whatever.

Case III. Mrs. Mary ———, aged 40, fair complexion, rather small stature, and of strumous diathesis. This case was one of chronic vascular inflammation of the cornea—one of those that resisted almost everything. The eye was extremely sensitive and painful. The whole upper half of the cornea was a mass of blood vessels. And after a month or so had been occupied in trying to better her condition, and the eye really being worse than when I commenced, I determined to curette the cornea. After explaining the nature of the operation the patient said, "Go on, I would rather have the eye out than to suffer all of the pain that I have had in the last two months." The eye was cocainized and curetted and dressed as the former cases were. The behavior was much the same as in the other cases, and after the second operation the case went on to rapid recovery, and aside from its opacities is comfortable, and I believe as well as it would have been had recovery occurred under the ordinary plan of treatment. In fact I do not believe that the eye would have recovered with any vision had any other plan of treatment been practiced.—MARTIN F. COOMES, M.D., Louisville.

Selections

Analysis of Hospital Work. Dr. J. J. Chisholm in an analysis of the year's work done at the Presbyterian Eye, Ear, Nose and Throat Charity Hospital, Baltimore, says:

The Free Dispensary Work for the year 1893, has been large—10,941 persons have been treated, with an aggregate attendance of 31,655. In analyzing the work I find much of interest, and worthy of note.

1,260 affections of the eye lids were treated. While squeezing out the lymph masses is found an excellent practice in trachomatous cases, jequirity bean has not been discarded. In pannus I find it more efficacious than any other treatment. My mode of application is to place a little of the jequirity powder on the conjunctival surface. In the course of a few hours all the peculiar phenomena belonging to the local irritation of the drug appear, and usually accompanied by so much pain as to require morphine internally for its relief. In twenty-four hours the lids are œdematous, and the conjunctiva and cornea are more or less covered with the characteristic greenish yellow exudate. This specific inflammation is of short duration. In three or four days convalescence starts, and steadily continues, until a very marked improvement shows itself in the vision. The accidents which have occurred in the experience of other practitioners, I have not met, and hence I apply the powder with confidence, expecting permanent good results from it.

In the treatment of tarsal tumors, the practice of the dispensary is to open them from the inner side of the lid, and, by means of a sharp steel curette, scrape off the epithelial lining of the sac. Blood takes the place of the gland secretion, which makes the tumor as large when the operation is finished as it was before the sac was opened. The blood swelling, however, undergoes rapid absorption. If the inner face of the sac has been properly scraped, within ten days the tumor disappears, leaving no evidence of its former presence.

In affection of the eye muscles—310 cases—there has been no peculiar method of treatment followed except the regular routine, of completely dividing the muscle when any operation was deemed necessary.

Affections of the conjunctiva—2,454 cases. Although nitrate of silver solutions are found essential for the successful treatment of puru-

lent ophthalmia, and for several cases of catarrhal inflammation, the solution is never given to patients, to be used by them at their own homes. The strength of the solution is one per cent. It is never used more frequently than once in the twenty-four hours, and is always applied by some member of the surgical staff, so that the effects of the previous drop can be seen at the daily visit before it is applied again. Under this cauterizing treatment, followed by the thorough cleansing of the eyes every hour of the twenty-four by a solution of borax, grs. 10 to the ounce, or a bi-chloride of mercury solution, 1 part to 4,000, I have never lost an eye from ophthalmia neonatorum which was brought to the dispensary before the cornea had become implicated. In dispensing astringents for conjunctival effections, it is found very convenient to color the solutions. The borax eye drop is made pink by adding a drop of cochineal; the Sulph. of zinc solution is made green by the addition of a drop of flourescin; while the bi-chloride of mercury is left colorless. These collyria, in such constant use in the daily working of the dispensary, are known by the patients as pink, green, or white drops. It enables the Staff to learn from the statements of the patient what local application has been used.

For corneal ulcers the galvano-cautery is found most efficient in stopping sloughing tendencies, and in promoting cicatrization. The use of the Japanese hot box in corneal ulcers, is one of the greatest comforts the hospital patients enjoy. It is a small, tight box, made of tin or copper, and about the size of the hand in length, breadth and thickness. In this box a lighted fuse of compressed carbon is placed. A slow combustion goes on for two or three hours, sustaining a temperature of about 115 degrees of Fahrenheit. When in use, the warm box is enveloped in a handkerchief, folded cravat fashion, and is tied over the painful eye, with a layer of cotton wadding intervening. In hospital language the box is called the pain killer, because it soothes a painful eye in a marvelous manner, which only the continuous application of heat will do. The hot box is constantly in use for all painful eyes, whether for corneal, scleral, or iritic inflammations. It takes the place of large doses of opium for the relief of glaucomatous suffering. In hundreds of cases, during the past five years, the hot box has proven itself the most convenient appliance in the hospital. In Japan, where they are made, and by the hundreds of thousands, they are found in every household. It was on account of their efficiency in relieving abdominal, throacic,

or limb pains in that country that I was induced to use them for the eye and ear. I find them invaluable. They, box and carbons, can be purchased wherever Japanese wares are sold.

Of lens troubles 498 were entered on the hospital books for 1893, which makes 5,615 cataract patients seen in the dispensary since the opening of the hospital sixteen years ago; the hospital staff has therefore had a very large experience in the treatment of cataracts. During the past year there were 178 operations. Of these 123 were cataract extractions, 36 with iridectomy and 87 without. During the preceding year there were only 27 extractions with iridectomy and 92 without. For the year 1894 extracting with iridectomy will be more frequent, showing a growing tendency in my belief that there is more safety with an iridectomy. Notwithstanding every care in the after-treatment of simple extractions, a certain percentage of iritic hernias will occur. This is the experience of every operator, whether in Europe or America, regardless of the after-treatment which they may adopt. Last year after 70 simple extractions which I myself made, there were 5 cases of prolapse of iris, or 7 per cent. of such accidents. When it is remembered, that for the last five years I have only closed the eye operated upon, and leave my patients to move about their rooms or lie in bed as they prefer, these results compare most favorably with the percentage of accidents in the clinics of the most skillful European ophthalmic surgeons who practice the most rigid restraint on the bodies of their cataract patients, keeping them in bed, on their backs, and with both eyes tied up. When such hernias occur I remove the protrusion early. While I have not lost a single eye from this hernia complication, convalescence is certainly retarded, and hence I consider an accident very undesirable. I confess that I do not know to what to attribute this accident, and therefore I do not know how to prevent it. In illustration I will give extracts from the history of two gentlemen who were recently operated upon for cataract without iridectomy. Both were smooth extractions, leaving clean central pupils. Only one eye in each case was involved in the blindness, and therefore, under my method of dressing, only the eye operated upon was closed. Each had an eye uncovered for use. They were healthy men, between 60 and 70 years of age. They were operated upon within a few minutes of each other, and occupied contiguous rooms in the private part of the hospital. One gentleman was of the lethargic type. He went to sleep soon after the operation, and had an uninterrupted nap of several hours. He seemed to have

a special gift for sleeping at any time. The other had a severe attack of irritability of the neck of the bladder, which came on during the evening of the day of the operation. For many hours it kept him passing urine every few minutes, accompanied by intense pain and severe straining. When I visited the hospital the next day I found him still suffering severely, notwithstanding doses of morphia which my resident physician had administered. I ordered at once a large dose of chloral-hydrate. This soon brought relief from pain, and with it sleep. The patient who had spent the first night after the cataract extraction in walking the floor, and straining every few minutes to urinate, left the hospital with a perfect, free, central pupil. The other, who led the most passive of lives, had a large iritic hernia which I had to remove. When I do a small iridectomy I have no anxiety for the patient and I expect a perfect result, with rapid convalescence.

In lost and painful eyes condemned for removal, I still perform optico-ciliary neurotomy in preference to enucleation if the eye is good-looking enough to be retained. I have never seen harm come from this course, but, on the contrary, have been able to retain a painless eye to the decided comfort of many patients. The only trouble that I have found from the primary neurotomy is that in some cases the eye pains return, and then the more radical removal of the painful eye-ball had to be done. The attempt at retaining the eye-ball does not make the final removal more dangerous, nor more difficult. In treating this class of cases at the hospital I find 86 optico-ciliary neurotomies standing against 544 enucleations. Evisceration of the contents of the lost eye-ball I have abandoned on account of the greater pain and swelling and much more tedious convalescence which follows the operation.

Refraction cases are very carefully worked out at the dispensary. Last year out of 2,140 patients needing spectacles, 1,057 were astigmatics, who suffered pains in head and eyes when at work. On the very great value of weak cylinders 0.25 D. in permanently relieving pain, I constantly have positive proof. Astigmatism is the common deviation from the typical emmetropic eye, and its presence among enlightened nations seems rather the rule than the exception. While this fault in corneal construction is so frequently met with, it does not always annoy. It is only when such eyes are called upon for extraordinary or long continued exertion that these small flaws cause trouble. Then much eye strain in reading, writing or sewing causes

pain in eyes and head. For the relief of this there are only two remedies, viz: rest, abstaining from all work, which the pressing demands of the day will not permit; or removing the cause of the muscle straining by the wearing of cylinder glasses. By far the most annoying eyes under work pressure are those with a small degree of astigmatism. In the grosser defects in corneal curvature, seeing is so imperfect that the eyes are not kept sufficiently long at work to cause pain. In hundreds of cases sewing girls and students keep on using their eyes all day without pain by the use of a 0.25 degree cylinder spectacle. These lenses stop irregular muscle action, and give comfort as long as they are steadily worn. That they can not be dispensed with in work without the return of pain, is the best evidence of their usefulness. I have had to make patients discard 0.50 degree cylinders, the over correction causing as much discomfort as when no correction was made.

* * *

An Improved Cell of Glass and Celluloid for the Preservation and Exhibition of Macroscopic Eye-specimens.

C. A. Oliver (*International Medical Magazine*, February, 1894) describes an air-tight cell for the preservation of macroscopic eye-specimens. It is made of two parts, the upper one being of glass in the shape of a Petry or chemical crystallizing dish, which sets into a celluloid base by means of a deep circular groove. The glass is filled with the preservative fluid (gelatine), the specimen introduced, and the base applied, and the whole inverted, the raised bottom will press out all air bubbles and the glass can then be cemented to the base. A single hand magnifying-glass of any amplication or the ordinary dissecting microscope is then used for examination of the specimen.

The Case Book. Under this heading we shall give the history of cases either original or selected occuring in the practice of different physicians. We are aware that there is a difference of opinion in reference to the results of tenotomies, use of .25 D. cylinders, etc., etc.

"Where there is good reason to believe that the headache is due to insufficiency of the ocular muscles (heterophoria), and prismatic spectacles are rejected, there only remains the result to graduated tenotomy of the stronger, opposing muscle, so as to restore, as perfectly as possible, the condition of physiological equilibrium (orthophoria).

CASE I. Dr. W. S. K., aged 32, consulted Dr. C. R. Agnew on April 25, 1877. He stated that he had no trouble with his eyes until September, 1876, when neuralgic pains about the root of his nose set in while reading. He used belladonna ointment over his brows until his accommodation grew weak, and he had to give up reading altogether. He then became excessively nervous all over. He consulted Soelberg Wells, who dialated his pupils and found his fundus normal, but that he had Ht 1.25 D. each eye. He has worn + 1.25 D. constantly since.

Dr. K. says his eyes first "broke down" while working all day with the ophthalmoscope and microscope, and then reading late at night. At Christmas he observed that he became worse when the gas was lighted. He went to church on one occasion, and the bright light caused great infra-orbital neuralgia and neuralgia of the third division of the fifth nerve. This has been confirmed a dozen times. Reading or walking in bright sunlight invariably brings on pain in the inferior maxilary region, the pain being more especially referred to the front teeth below. His teeth were never tender in mastication, and he has only one carious tooth, the first molar on the right side, and that is well filled. He is troubled with spasms about his internal canthi when he lies down. His digestion seems to be very good. Never venereal disease. His father was rheumatic and perhaps gouty. He says he is as nervous as a hysterical woman. He jerks and starts when he goes off to sleep. He suffers from sciatica of the left hip, but he attributes that to a fall from a horse when a boy. $V = \frac{20}{20}$ each with + 1.50 D. No insufficiency. Ophthalmoscopic examination giving him excruciating pain, lasting twenty-four hours or less.

The patient was referred to Dr. E. C. Senguin for an opinion. Dr. Senguin wrote:

"April 25, 1877, Dr. K.'s case has seemed very interesting to me. I am disposed to look upon his hyperæsthesia (face and limbs) as due primarily to insufficient nutrition. He has worked hard and used a diet, which I look upon as perfectly fitted to develope anæmia and neuralgia. I would suggest beefsteak and roast meats twice a day, ale or claret for dinner, and not much starchy food. Thompson's solution of phosphorus may also do good, and relief may be had by the positive pole of the galvanic battery. I don't find the usual symptoms of asthenopia."

April 26.—Hm 1.50 D. each. Cooper, and Wells, and Purvis, of London, all examined his eyes under atropine and found that his Ht was + 1.50 D. April 19, 1887.—The patient returns to me with a letter from Dr. A. W. Calhoun, of Atlanta. He stated that he got no relief from his glasses, and finally discarded them altogether. Since ten years ago he has suffered agony every hour that he has been awake, and he has been kept awake many nights with pain through the temples, through the roots of the nose, and through the teeth and malar bones. The main pain is through the malar bones and nose. No pain in top of head or in occipital region. R. V.= $\frac{20}{20}$ —; $\frac{20}{20}$ with + 1D.; L. V. = $\frac{20}{20}$ —; $\frac{20}{20}$ with + .75 D. No hyperphoria; esophoria 2°; abduction 2°; adduction 12°. May 7.—Esophoria 4°; in accommodation 0°; hyperphoria, R. 1°; abduction 4°; adduction 13°. Sursumduction, R. 0°, L. 0°. The patient was now referred to a physician skilled in diseases of the nose, who found that he had a deviated septum and operated upon it. He also operated upon his hypertrophied turbinated bone, but without much apparent benefit. May 12.—*Tenotomy of right internus*, leaving orthophoria, with abduction 8°; as found on testing half an hour after the operation. May 13.—Went to bed last night with a freedom from pain which he has not experienced for years. Esophoria 4°; abduction 8°. May 21.—Orthophoria; abduction 7°; adduction 19°; much improved. April 2, 1888.—The patient writes, "I have done a hard winter's work in the college and with my practice, and my eyes have held up very well."—*Dr. Webster in Headache and Neuralgia.*

BOOK NOTICES.

ANNALS OF OPHTHALMOLOGY AND OTOLOGY. A Journal of Practical Ophthalmology, Otology, Rhinology and Laryngology. Edited by James Pleasant Parker, M.D., 701 Olive St., St. Louis, Mo., in conjunction with an able staff of associates and collaborators. Published quarterly. Pages 100. Subscription price $4.00 per annum single copies $1.25.

The April number is before us and it is a pleasure to read the short and practically scientific articles it contains. Among the seventeen original articles we notice a number of interest to eye surgeons, such as, A case of Astigmatism when the contour of the Corneæ indicates the Axes, The conservative treatment of Muscular Insufficiencies, etc., etc. The mechanical execution of the *Annals* calls to mind the old saying "A thing of beauty is a joy forever."

DIFFERENTIAL DIAGNOSIS OF COMMON DISEASES OF THE EYE. In chart form, by W. F. Connors, M.D., Oil City, Pa.

This chart is intended for general practitioners to give the family physician a comparative table of the common diseases of the eye.

HEADACHE AND NEURALGIA by J. Leonard Corning, M.A., M.D., Consultant in Nervous diseases to St. Francis Hospital, etc. Published by E. B. Treat, 5 Cooper Union, New York. Price $2.75. 1894. With an appendix, *Eye Strain* a cause of *Headache*, by David Webster, M.D., professor of Ophthalmology in the New York Polyclinic, etc. Illustrated. Third edition.

This work is up to date on causation, diagnosis, prognosis and treatment of headaches and neuralgia in their various forms. A valuable addition to a medical library.

SIR FRANCIS BACON'S CIPHER STORY. Discovered and deciphered by Orville W. Owen, M.D. Vol. I and II. Howard Publishing Co., Detroit. 1894.

Did Shakespeare write Shakespeare? That is the question. Dr. Orville W. Owen, of Detroit, claims to be the discoverer of a practical scheme of cypher writing in which it is asserted that Francis Bacon was the lawful son of Elizabeth, Queen of England, and Robert Dudley, Earl of Leicester, these two having been secretly married in the Tower of London, and that he composed all the plays of Shakespeare, Christopher Marlow, Robert Green, George Peele, etc. It seems to be Baconian evidence in the Shakespeare-Bacon controversy.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I JUNE, 1894. No. 3

THE MODERN EYE*

WITH AN ANALYSIS OF 1300 ERRORS OF REFRACTION.

BY W. F. SOUTHARD, A.M., M.D. (Harv.)

Read before the San Francisco County Medical Society, 1893, and afterwards published in the *Pacific Medical Journal.*

FOUR years ago the examination of this series of 1300 errors of refraction was begun by me. At the end of two years my examination of this series was closed, since which time very careful study has been given to each case. I now present to you for your consideration an analysis of these cases, together with statistical tables and graphic charts arranged for easy reference. The material for this study has been wholly taken from my private case book and in regular rotation, there being no attempt at selection of cases to illustrate any one point. At the time of making these records I had no prejudices, preconceived theories or pet hobbies to bias my mind. I have tried to set down all facts in each case just as they presented themselves to me at the moment of examination. After noting age and occupation, every symptom, no matter how apparently trivial, was recorded in the patient's own language, whenever practicable. It has been my purpose to get from each one what he considered his most serious disturbance. If headache was the principal symptom, its characteristics, such as its nature, time of occurence, duration and frequency, were carefully noted with especial reference to work and position as to light and character of the latter. Of typewriters, stenographers, bookkeepers and clerks I now invariably inquire closely as to the character of the light under which they work and their position with reference to it. If electricity is the illumi-

*By request of a number who have been unable to secure Dr. Southard's article, the portion relating to the analysis of the 1300 cases is inserted in this issue.

nant, it is important to know what protection is given the eyes. This is a very practical question at the present time, since the use of electricity is becoming so universal, and in many large public buildings, factories and business places it is the sole method of illumination and in some cases is made to take the place of daylight. The light even from the incandescent is so intense that a moment's direct look without the intervention of some kind of a shade produces unpleasant sensations upon the eye. Constant work under such glare has been the cause of a great deal of eye-disturbance, and almost daily I am meeting with cases directly traceable to this as a cause. To render such light harmless it is only necessary to shade the light with ground glass, or even tissue paper.

If the principal disturbance complained of by the patient was blurring of the print or running together of the lines, or similar difficulty, its frequency, duration and general effect on the eyes were carefully noted. If the eyeballs occasionally got red, I noted whether it was after use at near work or under what circumstances. Blepharitis—inflammation of the edges of the lids and formation of crusts—a very frequent disturbance in the eyes of children, always causes particular inquiry. For example, was it found to be less troublesome during vacation season? Keratitis—ulceration of cornea and conjuctiva—caused similar inquiry. As to these two troublesome complaints, I wish to put myself on record to the effect that I have yet to see a case of blepharitis or keratitis that did not have an error of refraction, the correction of which has, sooner or later, brought about a cure. The ordinary application of yellow oxide of mercury or other remedies to the lids, and constitutional treatment is not to be neglected. By the use of these and rest from work the patient will get well, but to remain thoroughly so the error of vision must be corrected. All forms of nervous disturbance were specially noted, such as muscular twitching of lids or of the face so frequently seen and found to have a close connection with defects of the eyes.

Having obtained these facts, the examination was continued by testing each eye separately and carefully with test-charts at a distance of twenty feet for visual acuteness. Other special tests were used, the recital of which is not at present material. To make the diagnosis more complete the ophthalmoscope and other instruments were then used, and thus the refraction accurately ascertained, whether hyperopic, myopic or astigmatic. The condition of the fundus, optic nerve and retina was always carefully examined for possible

pathological changes. Many drawings of the disk and retina were made, revealing that in nearly every case of hyperopia there was a deep porus opticus. My attention was first drawn to this point three years ago while examining the University students at Berkeley. Since then I have taken pains to see if this was a fact. An examination of over five hundred University students, in addition to these thirteen hundred eyes, has convinced me that this is a special peculiarity of the hyperopic eye. In high degrees of hyperopia it is generally very marked, especially in the young. I would be pleased to have other observers note this and see if my conclusions are correct.

In the work of tabulating these statistics I have grouped them according to ages taking them for every five years up to thirty, then by decades thereafter. The tables have been arranged for easy reference by those of you who care to examine them more closely at your leisure. The graphic charts have been made to assist the eye in determining the various points which it is hoped to develop. These charts deal wholly in percentages, while the tables deal with the percentages and units themselves.*

TABLE I.

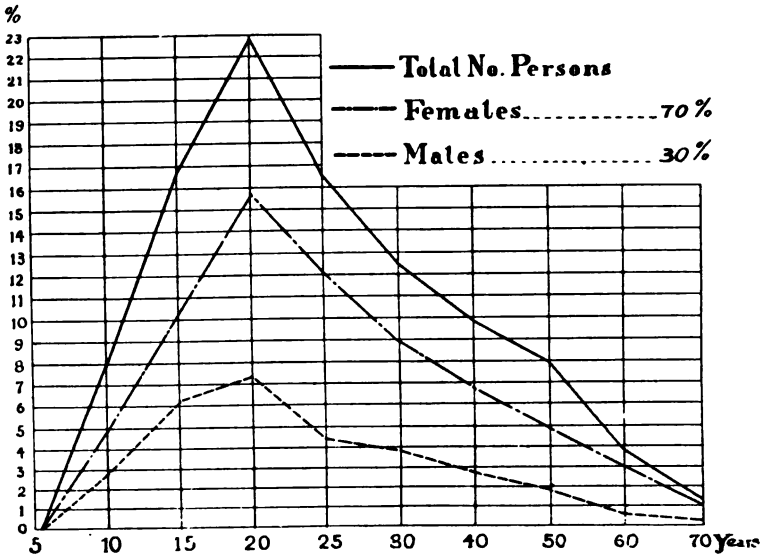
TOTAL NUMBER OF EYES BY AGES; ALSO SHOWING THE RELATIVE PROPORTION OF THE SEXES, ON A BASIS OF 1300 EYES.

Ages.	Total No. Eyes.	Per Cent.		Male.	Per Cent.		Female.	Per Cent.
5–10	104	8.00		38	2.92		66	5.08
10–15	216	16.61	56	80	6.15	55.23 Per Cent Male.	136	10.46
15–20	298	22.92		84	7.23		204	15.69
20–25	214	16.46		58	4.46		156	12.00
25–30	162	12.46		50	3.85		112	8.61
30–40	126	9.70		38	2.92		88	6.78
40–50	104	8.00		26	2.00		78	6.00
50–60	52	4.00		12	0.93		40	3.07
60–70	24	1.85		6	0.46		18	1.39
	1300	100.00		402	30.92		898	69.08

Table I and Chart A have to do with the percentage of eyes examined for each age and the proportion according to sex. The principal feature to which I would ask your attention is the abrupt and rapid rise of the curve from the tenth year, reaching its climax at the twentieth year, then descending equally abruptly. The jump

* The vertical lines or ordinates indicate the age; the horizontal or abscissæ represent the results in percentages.

CHART A.



from 8 per cent at the tenth year to 16.61 per cent at the fifteenth year is particularly worth noting; *i. e.*, there were something over twice the number during the five years' interval from ten to fifteen than there were between the fifth and tenth year. The jump between the fifteenth and twentieth year, though large is not so great, being but 7 per cent, yet this is to be noted as being the culmination of the curve in this as well as all of these charts.

It will be found no less instructive, as well as interesting, to consider the two minor curves in chart A, which indicate the proportion of the sexes, females being 70 per cent and males 30 per cent of the total number examined. Between 10 and 55 years of age the percentage is the same for each sex, viz. 55.23 per cent.

A moment's consideration will show that this disproportion is within bounds. By comparison with Dr. Gould's tables of about three thousand cases, it will be seen that he had 76 per cent females and 24 per cent males—a percentage even larger than mine. Taking the females as a class, we find that at a very early age they are taught to sew, and, as they grow older, more and more difficult tasks are set for their eyes in the matter of close work, that is, work at near range. At the school age, in fact all through school life, they are expected to do a large portion of their own sewing as well

as attending to all their school lessons. Instructions in painting, music and embroidery, or some equally trying work, is pursued as a matter of course and in addition to their special work.

Girls are also more conscientious than boys in their studies. They are more ambitious to excel, and failure is more keenly felt by them as a rule. This may be in part due to a more highly developed nervous organization.

I have been asked if this difference of the sexes between 10 and 25 years of age might not be due to the greater attendance of girls than boys at school. I will briefly say that investigation shows that, up to the last two grades of the grammar school, the sexes are about equal. After that necessity compels a very large number of boys to leave school and go to work. The high school shows a larger attendance of girls than boys, yet at no time was there found to be a greater difference than 50 per cent. Consequently we must look elsewhere for the cause of this disproportion found in our tables.

TABLE II.

Showing the Number of Eyes Atropinized.

Ages.	Simple Hyperopia. Eyes.	Astigmatism. Eyes.	Total of Cases. Eyes.	Per Cent of Eyes Atropinized.	Per Cent of 1300 Eyes.
10	23	19	42	8.71	3.28
15	45	86	125	25.93	9.61
20	43	93	136	28.21	10.46
25	34	40	74	15.35	5.69
30	6	46	52	10.78	4.00
40	11	20	31	6.43	2.38
50	5	13	18	3.73	1.38
60	4		4	.82	.30
	171	311	482	100.00	37.07
	Per Cent of all simple Hyperopic Eyes. 22.50	Per Cent of all Astigmatic Eyes. 72.50			
	Per Cent of all Eyes 13.15	Per Cent of all Eyes. 23.07			

In all cases of hyperopia or astigmatism I have endeavored to obtain the consent of my patients to the use of atropia for the purpose of getting a more exact knowledge of the error to be corrected as well as to save time. Of this series I atropinized 37 per cent only.

(Table II.) This is a small per cent compared to the proportion I now atropinize, which is fully 90 per cent of all my refractive cases. I frequently and freely use homatropine and with good results, but also, very frequently, I am obliged to conclude the examination by using atropine. I will say here that I have never had a single ill result from its use. In the present series the relatively best results will be found among the astigmatics, for of these I atropinized 72.5 per cent. I have also taken especial pains to record final results in these cases. I have examined quite a number for the second time, but they have been almost invariably those who were not atropinized.

The ability to see a given object at a given distance is called visual acuteness. The standard of visual acuteness has been generally agreed upon to be equal to $\frac{20}{20}$, and this is called normal vision. Many eyes have vision equal not only to $\frac{20}{20}$ or to $\frac{20}{16}$ but even to $\frac{20}{10}$.* Now a vision that equals $\frac{20}{20}$ does not necessarily mean that such an eye is free from error of refraction. On the contrary, it is the experience of all oculists that those of our patients who are the greatest sufferers from eye-strain are those who have a visual acuteness indicated by $\frac{20}{20}$ or better. This acuteness of vision we know is brought about by the use of the ciliary muscles mechanically counteracting the error of refraction. Vision being normal, however, indicates the possibility that there is no intraocular disease, and in so far it has value.

TABLE III.

SHOWING PERCENTAGE OF EYES HAVING VISION EQUAL $\frac{20}{20}$.

GROUPS.

Ages.	Eyes.	Per Cent of Series.	Per Cent of all Eyes.
5–10	66	8.81	5.07
10–15	133	17.75	10.23
15–20	208	27.77	16.00
20–25	135	18.02	10.38
25–30	75	10.01	5.76
30–40	79	10.54	6.07
40–50	49	6.54	3.76
50–60	4	.53	.30
Total.	749	100.00	57.61

Table III shows the proportion of those with vision of $\frac{20}{20}$ or better, for the different ages by percentages; 57.61 per cent, more than one-half, had so-called normal vision.

* See Noyes, Diseases of the Eye, p. 23. Hartridge, Refraction of the Eye, p. 48.

Not a single one of these cases having vision equal to $\frac{20}{20}$ retained that acuteness under atropine. It is true that I have seen a few cases (not among these, however) where, under the effect of atropine, the eye would see equal to $\frac{20}{20}$, but in every such case the same eye when free from atropine would see far better than $\frac{20}{20}$, running sometimes as high as $\frac{20}{10}$. Hence it is clear that in every case the paralysis of the muscle of accommodation causes a loss of power to see, and demonstrates the fact that the mere ability to see $\frac{20}{20}$ is no indication whatever that there is no error of refraction.

The analysis of the symptoms accompanying these statistics shows that, among these very cases having acute vision, there were many who were the greatest of sufferers from the effect of errors of refraction.

It is to be remarked that 63 per cent of those having a vision equal to $\frac{20}{20}$ were between the ages of 10 and 25; over one-fourth or 27.77 per cent were between 15 and 20 years of age. This is in accord with the fact that the muscle of accommodation is at its greatest strength at these ages.

TABLE IV.

GENERAL REFRACTION OF 1300 EYES.

Variety of Error.	Eyes.	Per Cent of H.	Per Cent of All
Simple Hyperopia. . .	759	74.63	58.38
Simple Hyperopic Astig.	52	5.12	4.00
Hyperopia with Astig. .	206	20.25	15.80
Total Hyperopia . .	1017	100.00	78.18
		Per Cent of M.	
Simple Myopia . . .	112	38.62	8.62
Simple Myopic Astig. .	118	40.69	9.06
Myopia with Astig. . .	53	18.72	4.14
Total Myopia . . .	283	100.00	21.82
Grand Total . . .	1300		100.00

Table IV gives the general refraction of the whole series. I have given this table in order to compare my results with a similar table published by Dr. Gould two years ago.* On several important points there is a very close agreement, for example, we both show that over three-fourths of all our cases were hyperopic, Dr. Gould's

*Gould, Statistics and Lessons of Refraction, *Jour. Am. Med. Ass'n*, p. 433.

percentage being 77 per cent, my own 78.18 per cent. By his table he shows a difference in percentage between hyperopia with astigmatism and myopia with astigmatism of but 3 per cent. My table shows a difference of only 2 per cent. He says "relative to its own group the cases of simple hyperopia have been nearly twice as numerous in hyperopia as those of simple myopia in myopia." My own tables show the same relative difference between the simple hyperopia and simple myopia.

TABLE V.

TABLE OF REFRACTION OF 1300 EYES.

Ages	Simple Hyperopic Eyes	Per Cent of Hyperopia	Per Cent of All.	Simple Myopic Eyes	Per Cent of Myopia	Per Cent of All.	Astigmatic Eyes of every kind	Per Cent of Astigmatic	Per Cent of All.
5–10	81	10.68	6.15	8	7.14	.61	15	3.49	1.15
10–15	120	15.81	9.23	10	8.93	.76	86	20.00	6.61
15–20	157	20.69	12.07	25	22.32	1.92	116	27.04	8.92
20–25	129	16.99	9.92	25	22.32	1.92	60	13.96	4.62
25–30	68	8.95	5.05	15	13.30	1.15	79	18.41	6.07
30–40	72	9.48	5.52	6	5.35	.46	48	11.18	3.61
40–50	69	9.09	5.30	10	9.93	.76	25	5.82	1.92
50–60	45	5.09	3.37	7	6.25	.53			
60–70	18	2.37	1.38	6	5.35	.40			
Total	759	100.00	58.38	112	100.00	8.62	429	100.00	33.00

TABLE VI.

TABLE OF REFRACTION OF 1300 EYES.

	Simple H. and H. plus Ah. Eyes.	Per Cent of All H.	Per Cent of All Eyes.	Simple Myopia and M. plus Am. Eyes.	Per Cent All Myopic Eyes.	Per Cent All Eyes.	Simple Astig. Am. & Ah. Eyes.	Per Cent of Astig.	Per Cent All Eyes.
10	90	9.32	6.92	10	6.06	.76	4	2.35	.30
15	181	19.36	13.92	15	9.09	1.15	20	11.76	1.53
20	208	21.56	16.00	33	20.00	2.53	57	33.52	4.38
25	153	15.95	11.76	43	26.06	3.30	18	10.58	1.38
30	102	10.56	8.00	29	17.57	2.23	31	18.25	2.38
40	86	8.91	6.61	10	6.06	.76	30	17.65	2.30
50	82	8.40	6.00	12	7.27	.92	10	5.88	.76
60	45	4.66	3.46	7	4.24	.53			
70	18	1.86	1.38	6	3.63	.46			
	965	100.00	74.23	165	100.00	12.69	170	100.00	13.07

Tables V and VI, together with Charts B and C, are intended to illustrate the proportion which the various errors of refraction bear to each other.

CHART B.

Simple H., Simple M.,
Ah. and H. + Ah.; Am. and M. + Am.

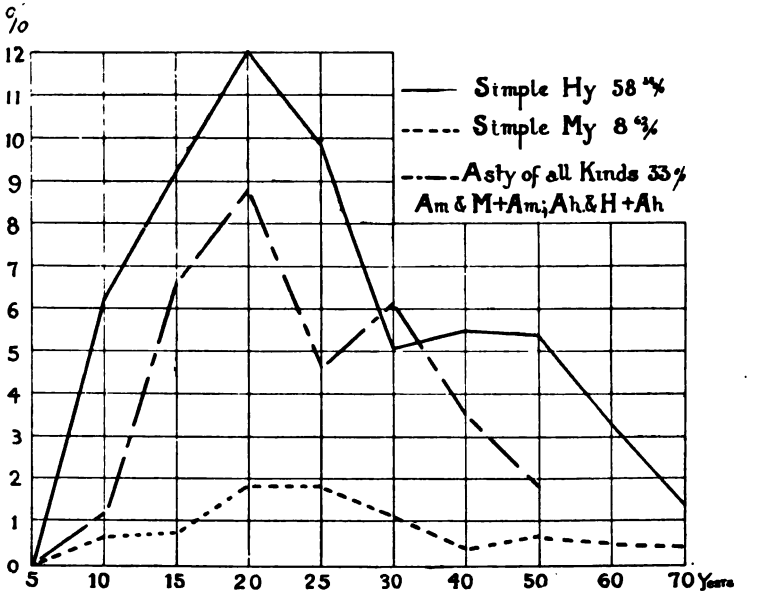


Table V gives the units with percentage of simple hyperopia (H), and simple myopia (M). It will be seen that hyperopia comprises over one-half (58.38 per cent) of the total number of units; myopia numbering only 8.62 per cent; while the remaining 33 per cent includes the total astigmatics. On chart B the curves of hyperopia and astigmatism are seen to approach quite near each other at the twentieth year. This is due to the fact that with the astigmatics are included a large number of hyperopes and myopes. To approach, therefore, more closely to the true proportion which all hyperopes and myopes bear to each other, Table VI and Chart C were constructed. Here it will be found that in the first column I have given all hyperopes with astigmatism (H. and H. + Ah.); in the second column all myopes with astigmatism (M. and M.+Am.); leaving in the third column only cases of simple astigmatism.

The curves on Chart C show the results of this method of analy-

sis, for if the cases of hyperopia and myopia are taken from the column of astigmatism and placed in the column of hyperopia, and curves constructed accordingly, the curves of hyperopia and myopia will at once rise, while the curve of astigmatism drops to the lowest position.

CHART C.

H. and H.+Ah.; M. and M.+Am., and Am. and Ah.

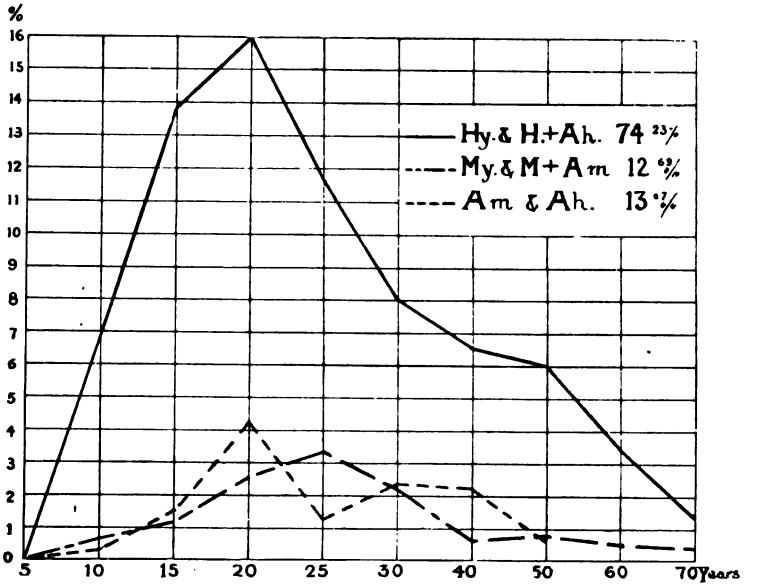


Table VII and Chart D give the refraction of 925 hyperopic eyes in dioptrics. This table is quite important as, with Chart D, it very clearly shows that the dioptrics of low power greatly preponderate, for we find that the three numbers .75, 1 and 1.25 dioptrics are over 70 per cent of the hyperopics and 50 of the whole series. The double lines give the percentage for the hyperopes, the solid black line the percentage for the whole series.

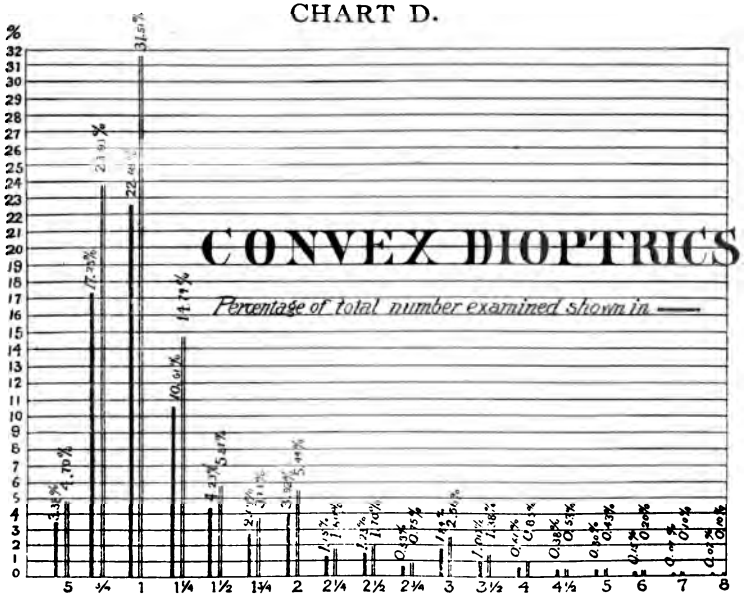
An analysis of the symptoms plainly shows that fully 80 per cent complain of headache or eye-pain as the most prominent symptom. We find also that those of our cases who suffered the most intensely with the various forms of nervous disorder are those who have been relieved with glasses of low power. It could be readily demonstrated (had we the time and space for that purpose) that these small errors of refraction easily corrected were the causes for such disorders. Having seen the intimate relationship that exists between eye-strain

TABLE VII.

Refraction of 925 Hyperopic Eyes Expressed in Dioptrics.

Degrees. D.	Simple H. Eyes.	H. plus Ah Eyes.	H. and H. plus Ah. Eyes.	Groups. Per Cent of all H	Groups. Per Cent all Eyes.
0.50	26	20	46	4.97	3.53
0.75	159	54	213	23.02	16.38
1.00	263	42	305	32.97	23.46
1.25	98	34	132	14.27	10.15
1.50	41	15	56	6.05	4.30
1.75	23	8	31	3.35	2.38
2.00	32	15	47	5.08	3.61
2.25	9	8	17	1.83	1.30
2.50	10	7	17	1.83	1.30
2.75	3	2	5	.54	.38
3.00	14	6	20	2.16	1.53
3.50	10	4	14	1.51	1.07
4.00	5	1	6	.64	.56
4.50	3	2	5	.54	.38
5.00	3	1	4	.43	.30
5.50	0	1	1	.10	.07
6.00	2	2	4	.43	.30
7.00		1	1	.10	.07
8.00		1	1	.10	.07
	701	224	925	100.00	71.15

CHART D.



and low refractive errors, it would seem to need no further argument to show the necessity for correcting every such error.

TABLE VIII.

Refraction of 164 Myopic Eyes Expressed in Dioptrics.

Degrees. D.	Simple M. Eyes.	M. and Am. Eyes.	M. and M. plus Am. Eyes.	Groups.	
				Per Cent of All M.	Per Cent All Eyes
0.50	0	3	3	1.82	.23
0.75	6	4	10	6.09	.76
1.00	10	9	19	11.58	1.46
1.25	9	6	15	9.15	1.16
1.50	4	4	8	4.87	.61
1.75	7	3	10	6.09	.76
2.00	10	3	13	7.92	.10
2.25	8	2	10	6.09	.76
2.50	3	1	4	2.43	.30
2.75	3	3	6	3.65	.46
3.00	2	2	4	2.43	.30
3.50	5	3	8	4.87	.61
4.00	4	1	5	3.04	.38
4.50	8	2	10	6.09	.76
5.00	9	1	10	6.09	.76
5.50	2	2	4	2.43	.30
6.00	5	1	6	3.65	.46
7.00	5	1	6	3.65	.46
8.00	1	1	2	1.21	.15
9.00	0	1	1	.60	.07
10.00	5	0	5	3.04	.38
11.00	1	0	1	.60	.07
12.00	3	0	3	1.82	.23
14.00	1	0	1	.60	.07
	111	53	164	100.00	12.61

Table VIII gives the refraction in dioptrics of 164 myopic eyes. The number of units being very small, I have not attempted to show the results graphically.

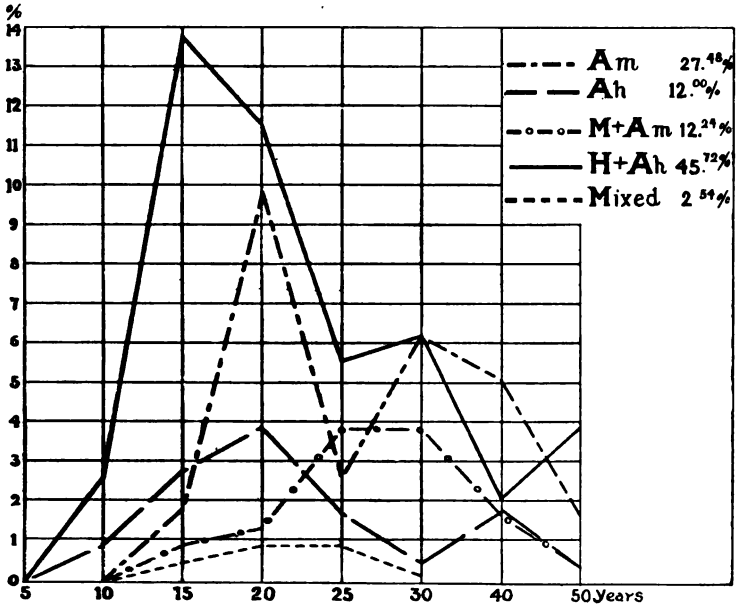
Chart E shows the curves for the different forms of astigmatism. The highest percentage is found in compound hyperopic astigmatism (H.+Ah.) 45.72 per cent; simple myopic astigmatism (Am.) 27.41 per cent; compound myopic astigmatism (M+Am.) 12.24 per cent; simple hyperopic astigmatism (Ah.) 12 per cent; lastly, mixed, only 2.54 per cent.

In conclusion, as the result of my study of these 1,300 cases, I feel that I can do no better than to quote these words from Dr. Gould (a writer from whom I have derived a great deal of inspiration):

"The amount of human misery caused by ocular defects is appalling, and if the prevention and relief of that misery be the motive of

scientific medicine, no branch is more important or demands higher powers of mind than that of ophthalmology, and *nine-tenths of modern ophthalmic practice consists of refraction.—Loc. Cit.*, *p.* 442.

CHART E.



The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M.D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Some Ideas of Refraction Work.

Methods of doing refraction work are so numerous and varied in their details, that it is often a difficult question to decide which is the best. One would naturally suppose that he who refracts the greatest number of cases, acquires the greatest amount of skill, but this is not always the case; observation has taught me that he who refracts the largest number of cases with the greatest amount of care, and makes note of all the minute points in interesting cases, will eventually become the skilled refractionist. Theories are very nice for us to advance and talk about at our monthly and annually society meetings, but facts, and theories founded upon facts, are what we want. Practical work, by carefully following up your cases afterwards, and trying to benefit by any mistakes and corrections that you are obliged to make, will in the end give you the best results.

From an experience of over 6000 cases of refraction, both in hospital and private practice, my method of doing work of that kind is as follows: After recording a full history of the case, I make a thorough objective examination of both eyes, take the distant vision of each eye separately, and if that is found defective, I make an ophthalmoscopic examination first, before proceeding with my refraction work, and if any pathological conditions are found, I know how to proceed with my case, and thus save valuable time which would be otherwise lost, by trying to refract the case first. I do not use a mydriatic as a rule in patients over 40 years of age, but in all cases under that age I do use it, except in fairly high degrees of myopia. Homatropine in a solution of 8 grs. to the ℥i dropped in the eye every ten minutes from five to eight times during an hour will generally give me the desired effect.

I have tried homatropine discs as used by Dr. C. A. Wood of

Chicago, but find two principal objections, one is, that patients do not like to sit for an hour with their eyes closed, the other is, the greasy film which often covers the cornea, and somewhat obstructs acute distant vision during the time you are refracting your case. I use atropine in most all cases of alternating strabismus, and especially so in children.

I never hurry my cases more than is absolutely necessary to get the best results, and yet sometimes, many a brilliant result is not obtained by being too much in a hurry, especially if you have an illiterate patient, or one slow to answer your questions. After finishing my refraction work I examine the case again ophthalmoscopically to prove the axis of astigmatism, and in children use the retinoscopy test in addition. In children under 10 years of age I depend almost entirely upon retinoscopy. I hardly ever find it necessary to have a patient return more than once before I prescribe their lenses.

The trial case, ophthalmoscope and retinoscopy mirror, is what I depend on. Ophthalmometers in my practice have not given satisfactory results, besides, they consume valuable time, and one cannot depend on them for good results, but must finally use the trial case before prescribing for your patients. Generally I do not use an astigmatic card for usually half the cases to be examined are not able to distinguish the difference in shades of lines, and are frequently mistaken in their answers, especially if the card is not well illuminated, or there are side lights shining upon it in an oblique direction. I have found by experimenting upon myself, that it is very difficult sometimes to distinguish a .25 shade of astigmatism among a number of lines, especially on cloudy days. After having obtained the best vision I can with plain sphericals, I proceed by trying a cylinder in the several principal meridians and tell my patient to watch carefully whether there is any improvement in the vision, beginning at the point previously left off by the best spherical lens.

If the acuity of vision is not improved in either the horizontal or vertical meridians, I tell my patient to watch the letters carefully, while I rotate my cylinder to the right or left from the starting point, and tell me whether there is any improvement in it or not. In this manner I can generally determine quite accurately the amount, and axis of the astigmatism. Having finished my correction, I frequently refer them to the astigmatic card and show them the difference of the shades of lines with the cylinder in and with them out of the trial frame. In this way I frequently prove my work if I am in the least

doubt after having examined them with the ophthalmoscope and retinoscopy test. It is often difficult to decide which gives the best vision, a + .50 cyl., axis 90°, or a — .50 cyl., axis 180°. This is frequently the case with or without a mydriatic. I then generally decide by asking the patient which feels the most comfortable to the eye, and compare it to the retinoscopy test.

In myopia, I find very little difference in the final result, by correcting it with or without a mydriatic. The principal changes that are occasionally noticeable, are in the axis of the astigmatism. Without using a mydratic in myopia I sometimes find a case which requires a —.50 or .75 cyl., axis 45°, see $\frac{15}{15}$ clearly, or it may be combined with a — spherical, and make all the lines equally shaded, yet I am compelled to change the cylinder to axis 90° for comfort to the patient, even though they do not see so plainly. I think that if such a patient is thoroughly under a mydriatic, the axis will show 90.° Such cases show the necessity of a cycloplegic in all cases.

In myopic patients with presbyopia, I find it very necessary in order to give them comfortable and good distant vision, not to hurry the work, for they all require careful correction to give them satisfactory results for distant objects, as well as for all near work. In myopes under 30 years of age as a rule I give full correction up to 5. D., and from 30 to 40 years of age, three-fourths correction, but in those over 40 years, especially after presbyopia has begun, I seldom give full correction for distant vision, and am always sure not to give too strong a + lens, or cylinder if they need a cylinder for their close work. If you fully correct their distant vision and give them a full correction for their close work, they very often complain of discomfort, and you will be obliged to go over your work again. Always rather under-correct than over-correct in these cases. Time and space will not allow me to finish this subject now, but will continue it in some future issue.

J. WALTER PARK.

* * *

Thanks. We wish to extend thanks to those Journals who have kindly noticed the launching of THE REFRACTIONIST. For the most part they have been very favorable. We are well aware that the Journal is not large in size so far as number of pages is concerned. We prefer to have fewer pages and not conduct a Journal so besmirched by advertising dodges that it is with difficulty that you know whether you are reading a straight article or one that is going to end in recommending some of the latest pharmaceutical (?) products. Nor shall we claim to have wholly original articles. Many articles in ophthalmology printed in general Medical Journals are worthy to be reprinted in a collection bearing on that subject more particularly.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I JULY, 1894. No. 4

THE CHOICE AND PROPER CARE OF SPECTACLES WITH PRACTICAL HINTS AS TO THEIR USE.

BY C. R. GARDNER, C.E., M.D., NORTHAMPTON, MASS.
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THE responsibility of the oculist to the patient does not end with the writing of the formula for the lenses. The hours of conscientious work, devoted to an accurate discernment of the refraction, are of no avail unless the lenses are mounted and centered properly. Use and service are overlooked by the patient when he chooses a frame so delicate that every movement of the head causes dancing images or one so fine that it bends on slight provocation.

The text books leave the ophthalmic novice in the dark on many points of practical interest concerning spectacles and eye glasses. While every movement of the skilled optician's fingers accomplishes its purpose, my early attempt to remedy mechanical defects in measurement were somewhat ludicrous because of their awkwardness. Oculists situated at a distance from good opticians are forced to furnish their own glasses if they wish to do satisfactory work, and in order to adjust frames properly, certain details of the optician's business must in some way be acquired. If patients cannot or will not keep their frames horizontally true, trouble is sure to follow and patients go elsewhere blaming the oculist because of a fancied misfit. It is not customary for patients to be so loyal to their oculist as to travel from Montana to New York City seeking relief from blurred vision, as Prof. Ranney reports, and obtain relief in five minutes by readjustment of the frame. If that patient had been impressed with the importance of keeping his glasses true, and taught how to determine their being horizontal, his journey across the continent would have been saved.

Although patients are *proverbially heedless* about this important need of the frames being kept in a horizontal position, I feel that I am not doing my duty by them unless I tell them how to determine this fact; also, how to care and best preserve the lenses from being scratched, the frames from being bent or how to readjust the latter when out of shape. At the time of the examination I could not always spare time for these details, and as many patients live at a distance, I would write; thus spending hours in needless repetition of what I felt sure might aid them should difficulties arise. To save these hours of writing, I had the following paper printed which I offer to the profession in the hope that it may meet with their approval. One of the most helpful papers upon the subject of spectacle frames was from the pen of Dr. Geo. M. Gould, of Philadelphia, in the *Annals of Ophthalmology and Otology*, in Volume I. Dr. Jackson and Dr. Philips have also written able articles, and I wish to give credit herein to these and all other writers for any thoughts that I have assimilated from their writings.

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FACTS AND DIRECTIONS WORTH REMEMBERING CONCERNING THE EYE AND THE USE OF SPECTACLES.

Before commencing the regular use of your glasses, the oculist should have seen them placed in position before the eyes, ready for their intended use. He should also carefully verify the accuracy of the lenses. Without the opportunity for such an examination, it would be impossible for the ophthalmic physician to be certain that your frames fit you, or that you are deriving the expected benefit from your lenses. However conscientious and painstaking his previous efforts in your behalf have been, they are always partly, and in some cases "completely nullified," whenever the frames or lenses are not properly placed before your eyes.

The necessity of occasional visits to your oculist, or to some good optician, is strongly urged upon the wearer of astigmatic or prismatic lenses; because patients are not always able to judge correctly, as to when their frames are slightly out of adjustment, nor with the most careful directions to prevent it, or to correct it, are all able to profit thereby.

We should therefore recognize the palpable fact, that to derive the most comfort from our eyes, we must use them reasonably and not unreasonably, and that not only our glasses, but also the frame, should be correctly adjusted and properly worn.

The following directions may be of some assistance to you in correcting any trouble with your glasses:

ASTIGMATIC OR PRISMATIC LENSES MUST ALWAYS SET EXACTLY HORIZONTAL.

1st. The slightest tipping from a horizontal position may cause headache or great discomfort. Eye glasses are therefore, with few exceptions, unsuitable for astigmatic or prismatic lenses, because they are seldom worn true horizontally.

2d. The frames of your glasses ought to be placed lower before the eye whenever used for near work, such as reading or sewing, or for steadily seeing anything within three feet of the eye, than when used for seeing objects beyond three feet. (This rule does not apply to bi-focal lenses.)

3d. The focal center of each glass ought to be directly in front of the pupil of the eye for which it is fitted, unless decentered by the oculist for special purposes. Many lenses are not properly centered when put into frames; any defect of this character may cause discomfort, and frames not centered are unbecoming to the wearer.

4th. Glasses used for near work ought to have the upper border stand outward from the face more than the lower border, or in other words, the top of the glasses ought to be tipped forward; the planes of the eyes, the glasses and the work will then be more nearly in harmony with each other.

5th. Often when looking downward, unless the glasses are tipped forward at the top, objects will appear out of place. In cases requiring astigmatic or prismatic lenses, if objects appear out of shape or place, it is the result of a mental habit, that generally disappears soon after the persistent use of correctly adjusted lenses; and in such cases, closing the eyes a few seconds when glasses are first put on, or taken off, makes the change less noticeable.

6th. Glasses that are correctly ground and accurately adjusted, frequently cause discomfort or blurring, and sometimes pain, when first worn: especially with patients that have not previously worn glasses, or in cases where there is a radical change from their former glasses. Such patients, consciously or unconsciously, have exercised heretofore a certain amount of muscular effort in the act of seeing that still persists as a habit to be overcome or changed before their glasses can possibly become easy and clear. As a rule, these unpleasant effects rapidly disappear, after a few days faithful

trial of the glasses; although in rare cases, a month or six weeks may elapse before the full benefit can be expected.

Glasses that are adapted for distant sight, as well as for near work, should be worn all the time if they fail to give the desired comfort when used for close work only. If the eyes feel uncomfortable when they are lain aside, it is because the muscles of the eye need their assistance. If prolonging the use of the glasses cause tears to flow, and increasing pain or headache, which cease when not in use, then be assured there is something that needs correction. Some times a slight change made in the frame or its position makes them easy at once.

7th. Remember also that you may use your eyes too much, even with glasses. What would be proper use for one person would be improper use for another.

8th. Do not read lying down, or on the cars when they are in motion. Let the illuminating light, if possible, come from over the shoulder. Avoid poor illumination and indistinct or fine print. Rest the eye often when reading by looking a few seconds at distant objects. Fourteen to sixteen inches is a proper distance to hold a book when reading.

9th. The oculist may correct all of the anomalies of refraction and errors of accommodation that the patient's eyes reveal, but in some instances it would be unadvisable to do so. And there are cases of latent troubles that remain undiscovered until time and the wearing of glasses or the use of some mydriatic like atropine reveals them. To determine the true refraction for persons under forty-five years of age, having astigmatism or far sight, a mydriatic ought to be used; also, whenever spasm of the accommodation is suspected, because in such cases there is a spasmodic contraction of the muscle of accommodation that covers up the true refraction; sometimes changing a farsighted or a normal eye into a myopic eye, or a myopic eye into one of higher degree.

10th. Myopia (short sight), may be either congenital or acquired as to its origin, and either stationary or progressive in character. The acquired form is apt to supervene upon previously farsighted eyes. It is the most common kind, and when progressive in character is a diseased condition of the eye, contrary to the general belief that such eyes are strong and healthy, High degrees of acquired myopia are generally accompanied by imperfect vision. In children and young persons after the disease has once developed, it shows a

constant tendency to grow worse. In such cases as often as once in six months or a year, their eyes should be re-examined in order to secure the best safeguards against its growth. "From 19 per cent to 37 per cent of myopic children, in choosing their own glasses, choose too strong"—*Erisman—Cohn.* "Adults not infrequently make the same mistake." In hypermetropia (far sight), the same strength of glasses may serve for many years. In presbyopia (old sight), which usually appears soon after one is forty years old, the glasses used in reading need to be changed for stronger ones about every second year.

11th. Sight is not the only object to be sought in fitting glasses; the preservation of sight and the relief of overtaxed nerves is of greater importance. Physiologic and pathologic laws must be obeyed as well as optic laws.

Constitutional and local treatment are necessary adjuncts to glasses in the treatment of many cases of eye troubles, and it is unwise to depend upon either one, if both are indicated, because only temporary benefit is likely to follow partial treatment.

Care of Spectacles.

1st. Keep your lenses clear with old, clean soft linen or cotton. A few drops of aqua ammonia to a cup of water is excellent for cleansing; but this should not be used on cemented bifocal lenses.

Steel frames will retain their polish longer if occasionally rubbed with a woolen cloth, dampened with sewing machine oil. At the first signs of rust rub first with kerosene and follow with the oil. Oil them daily, and dry them often when wet with prespiration.

2d. Whenever spectacles are taken from the face, lay them on their edge, not on their face; by doing so, they are less liable to be scratched.

Tight joints prevent play of temple-pieces and help to make the frame more rigid. Therefore, do not usually shut or fold the spectacles, because the joints will in time become worn and loose thereby. A frame shut half a dozen times daily, in the course of a year is shut over two thousand times. The best of frames would soon wear out with such practice. If tightening the screws does not prevent their looseness, an optician can often remedy it by a minute washer or other means.

3d. In removing riding bow-spectacles from the head, use both hands, grasping the temples near the glass, and running the fingers

along the wires toward the ears, lift both sides at once. Do not pull them off, because you alter the length of riding bow-temples thereby, and cause the frame to drop too low on the nose. Do not use one hand, because unequal pressure is brought to bear on one of the temples, and your frames will soon set too near one eye and too far from the other. This can sometimes be remedied by gently bending the end piece on the near side in, with small plyers, so as to throw the lens out.

4th. To ascertain whether spectacle frames are horizontally true: place them face downward, on any straight ruled line, so that the bridge joints rest exactly on the line. If horizontally true, the joints at each end of the spectacles will also rest on the line, and the temples will cross at the center or slightly below. Very careful bending will enable you to make them true, if the four joints are not on the same line. If one ear is higher than the other, then the temples on that side should be bent up slightly to lower the glass; and the opposite temple perhaps bent downward to raise the other side: thus making the frame set horizontally true.

5th. The temples should just touch the sides of the head in order to steady the frames. If they leave a mark they are too tight and need bending out. To correct this, hold the frames with the left hand, and draw the thumb and fingers of the right hand along the temples, the thumb placed within and the fingers without, pressing the thumb gently out. Or with small plyers, applied at the end of the frame where the temples join, carefully bend the end piece out. If the temples are too far from the side of the head, reverse the above process. Skeleton glasses or rimless frames should not be bent, except by an optician, or by an oculist, because they are easily broken. When steel frames are rusty, use great care in bending.

6th. The temples should not begin to curve until they reach the top of the ears. The curve should then be sharp and conform to the curvature of the ear, fitting exactly the depression behind the ear. If the temples by pressure irritate the skin back of the ear, slightly elongate the temples, or bend the curve behind the ear at the point of iritation, so that it will not press so tightly. When the bridge irritates the nose, lengthen the temples. To elongate riding bow-temples, hold the frame with the left hand, and draw the thumb and fingers of the right hand (thumb placed above and fingers below), along the temple, pressing gently down with the thumb and turning the fingers away from the frame.

When the frames drop too low, the temples need shortening or the bridge sometimes needs to be bent outward. To shorten the temples, reverse the method for lengthening, placing the fingers above and the thumb below and gently press up with the thumb while turning the fingers towards the frame.

Special care of Eye-glasses.

1st. Eye glasses should be kept in a long case without folding. If folded, the spring becomes twisted and the lenses scratched.

2d. Each and every time they are placed on the nose, care ought to be exercised to put them horizontally-true and parallel to the eyes. If not worn exactly horizontal nerve-strain and muscular strain follow, and the visual benefits are lessened.

3d. In placing eye-glasses in position, use both hands.

4th. Do not allow other persons to try on your glasses, as they may alter the adjustment for your nose.

5th. When eye-glasses are too tight or set too high on the nose, spread the spring slightly. When they set too low, or the frame is too loose, the spring should be tightened. If the lenses "lop, or turn up," loosen the screws at the outer ends and turn the lenses until they sit horizontal.

6th. With Fox or other offset guards, bending the guards in at the top with plyers will make them hold better. If the lens tips up, bending the guard out at the bottom lowers the lens. If the lens tips down, bending the guard in at the bottom raises the lens. Bending the entire guard away from the frame throws the lens out; bending it in, throws the lens in. Skeleton eye-glasses need great care to prevent breakages.

The Choice of Frames.

The choice of frames is of considerable importance from a medical point of view. The success of the physician's efforts depends upon the accurate adjustment of the axes of the lenses. Frequently the patient returns to the physician within a few weeks saying: "My glasses no longer afford the relief they did at first," and it is the rule in such cases to find frames bent, so as not to be exactly horizontal. The correction of this fault at once affords comfort.

1st. Riding bow-temples stay on better than straight bows. They should be made of heavy material.

2d. A stout steel frame that keeps its position because it is rigid

and of proper temper is a much wiser choice than frail gold ones. If frames are too light, they are continually getting out of position, and break easily. If they shake with each movement of the head, they will cause dancing images of objects that tire the retina and exhaust the brain. Heavy temple-pieces retain their position simply by their shape and weight, and will last for years under proper care.

3d. The bridge whether of steel or gold needs to be quite strong, firm and heavy. The arms of the bridge ought to be just as strong as that part that rests on the nose. Its width should not be at the expense of the thickness; saddle bridges are usually preferable because they hug the nose more firmly and deeply and afford greater firmness to the position of the frame. The bridge ought to fit the natural depression existing at the angle between the forehead and nose. If properly inclined and the frames have temples not too taut, it will not hurt the nose.

4th. The best gold frames are 14k fine, and of extra heavy weight. When made of round wire they are inconspicuous. Such heavy frames will prove economical because less liable to bend or break; they will keep longer in a horizontal position and will also afford greater comfort than frail or less heavy gold frames.

5th. Skeleton or rimless spectcales are less noticeable than frames with rims. For constant wearing by careful patients, these are not very objectionable; yet great care should be exercised while cleaning the lenses or handling the frame to avoid exerting pressure or leverage near the screw holes; as these places are weak points, at which skeleton glasses are especially liable to be broken.

6th. Eye glass frames are made in so many different forms that most any kind of a nose can be fitted to some one of them. If the longitudinal axis of the frames can not be kept in a horizontal position, they are decidedly objectionable for astigmatic or prismatic lenses. The improved bar spring with some form of the Fox or Champion clip seems to meet most of the objections raised against eye glass frames.

"PRESCRIPTION WRITING."

By F. D. GREEN, M.D., Pueblo, Colo.
Eye and Ear Surgeon to the Missouri Pacific Railroad, etc.

IN connection with your commendable editorial in the May number of The Refractionist on "Prescription Writing," please permit me to make a few remarks, In reply to your query "What should the physician do who has a large practice and does not want to supply his work?" I would say, if no reliable grinders, who will refuse to refract (?) eyes is a resident of his city, he is in duty bound to supply his patient; not only so, but he is entitled to the additional profit accuring therefrom. I would like to ask your physician who thinks it "unethical" if it is unethical for a country practitioner to supply his patients with medicines and charge for the same, or if it be unethical for a physician to engage in other pursuits than his profession?

The refractionist should by no means patronize a manufacturing firm that does refracting(?). I do not even buy from firms having their name and address on cases; one such changed a pair of cylindrical lenses from spectacles to eye glass frames at the solicitation of a patient. When a firm that does nothing but grinding steadily refuses to take cases for refraction it is our duty to encourage them by giving them our patronage. We now have such firms in all our larger cities.

We as physicians should do all in our power to deprecate the influence of "graduate opticians", who, it is safe to say, do not make one proper correction in fifty. My experience with these opticians has been that they neither know how to correct the refractive error nor to properly fit the frame; the pupillary space being the same in all their frames, and no attempt being made to fit the nose or temples.

Correction of errors of refraction come properly under the head of medical treatment and should be so regarded by the law, and every person so prescribing should be held amenable to the medical laws of his state. I have had physicians say to me "These men make work for the refractionist"; true, but is it not our duty as physicians to look after the welfare of our fellow beings? When our profession ceases to do so and seeks only personal gain then I shall wish to change my profession. Not that we do not expect to live by the profession, for we could not expend valuable time besides money in gaining a medical education; but I contend that the true physician

is not actuated by mercenary motives solely. It is our duty also to protect the public from charlatanry whether it be in the form of the full fledged cure-all or the more respectable jeweler-optician.

We are glad of the many expressions similar to Dr. Green's. It shows that many are interested in this same question. We would like to hear from some of those who write prescriptions. Those heard from simply strengthen the feeling that there is among the laity that it is a "Scratch me on my back and I will scratch you on yours" system. It would be hard to find a leading optician in this country who has not got his start by physician's prescriptions. After a few years they snap their fingers at the physician and go to prescribing themselves while the physician goes on starting someone else. As in the previous issue we believe in protecting ourselves and our patients rather than in seeing this optical vandalism increase. Our patients prefer paying us one fee rather than being sent to some *particular* optician who "bleeds" them as he sees fit. This is what drives so many to our eye infirmaries and hospitals, and then after receiving the charitable (?) physician's services they go and buy an expensive gold frame.

Since writing the above a lady has been referred to the writer who states that she has been to see a physician at one of our dispensaries who asked her to go to his office as he did not have the equipment to examine her at the dispensary. She was given a prescription to take to the optician who charged her $3.00 for a pair of spectacles + 4 D. and $5.00 for a pair of sphericals + 6.50 D. in steel frames. She paid $8.00 for what should have cost $3.50 ($1.00 for the lenses and $2.50 for the other pair). The physician charged her nothing. She remarks that she has since found out that he gets his pay from the optician. Would it not have been more honorable for the physician to have charged her $5.00 and furnished her glasses thereby saving $3.00 for his patient and avoiding the accusation even if false of hob-nobbying with the optician.

"If not so frequent would not this be strange;
That 'tis so frequent this is stranger still." —Ed.

The Refractionist.

A Journal of Practical Ophthalmology.

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Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

For our Patients.

This number of THE REFRACTIONIST contains much that every physician doing refraction work is called upon daily to repeat to his patients. From correspondence received since it was suggested in a late issue to prepare a number of value to the laity the indications are that it will be widely read. If it is the means of calling the attention of any to the prevalent abuse of the eyes our end will be accomplished.

* * *

The Eyes in Infancy and Childhood.

Conjunctivitis, or inflammation of the lining membrane of eyelids, together with the membrane covering the white of the eye, is a common disease of all ages, especially in infancy and childhood. While the treatment should be the province of the physician, nurses and mothers should know some of the causes, that they may be prevented, and some of the symptoms, that the physician may be called in season. We will consider the following varieties: *Purulent*, *Simple Catarrhal*, *Non-catarrhal*, *Pustular and Granular.*

Purulent conjunctivitis, is the most destructive, and the first which the infant is liable to have. One of the causes is known to be the introduction of leucorrhœal or other discharges between the eyelids of the infant during birth (conjunctivitis of the new-born). Knowing the cause, the proper method of prevention in all cases of suspicious discharges would be to carefully cleanse and disinfect the vagina before puturition. If this is not practicable, the eyes need attention as soon as the babe is born. (In fact, as soon as the head is born a soft cloth moistened in a week solution, 2 per cent, of carbolic acid should be at hand with which to wipe rapidly the eyelids, to prevent, as far as possible, any secretion reaching the eye when

the lids are open. It is also a good idea to cleanse the mouth and nose at the same time, to prevent anything from being drawn into the lungs during the first inhalation of air.) As soon as born, extreme care should be taken to cleanse all secretions from the external surface edges and junctions of the lids. This may be done with a saturated solution of boracic acid. If after a few days any matter is detected in the eyes, the attention of the physician should be called to it at once, as serious trouble may follow. It is so serious a matter that in some states (New York, Maine, Rhode Island, Pensylvania and some others) laws have been passed for the prevention of blindness. The Maine law is similar to the law in the other states and reads as follows:

Section 1. Should one or both eyes of an infant become reddened or inflamed at any time within four weeks after its birth, it shall be the duty of the mid-wife, nurse or person having charge of said infant to report the condition at once to some legally qualified practitioner of the town, city or district in which the parents of the child reside.

Section 2. Any failure to comply with the provision of this act shall be punishable by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months, or both.

Section 3. This act shall take effect on the first day of June, eighteen hundred and ninety-one.

If the matter affecting the eye is received at birth, it usually appears in from one to five days. The symptoms most marked are swelling of the lids and sticking of the margins together by a thick secretion. On opening the lids a thick, purulent discharge appears. If these symptoms appear after the fifth day, the cause may be sought in an irritation from bright light, a cold wind, or poison from some other source, possibly indirectly from the vaginal secretions. At whatever age these symptoms occur, or from whatever cause, they should receive prompt attention, as a short delay may mean partial or total blindness.

On the part of the nurse or other attendant, extreme cleanliness must be observed, as the poison can be carried from one eye to the other, or from one child to another, by improperly cleaned hands or cloths left undestroyed. When an experienced nurse is in attendance, this is generally attended to properly, but as many cases of confinement have only some relative or neighbor in attendance, besides the physician, and possibly no physician, there is danger of too many eyes being sacrificed and blindness for life resulting. Our in-

stitutions contain too many children thus crippled for life and placed as a burden upon the community. Most frequently these cases are found among the poorer classes, and find their way into our dispensaries and hospitals with the story that the child took a cold a few days after birth, and that since that time they had been putting breast milk on the eyes, alum curds, bread poultices, or using some other ignorant treatment.

Purulent conjunctivitis may be caused in diphtheria from some of the discharge from the throat coming in contact with the eye (Diphtheretic conjunctivitis), or in gonorrhœa from some of the gonorrhœal secretion (Gonorrhœal conjunctivitis). Patients having these diseases have lost their sight through ignorance, while physicians and nurses have been known to loose one or both eyes from improper care of themselves, or by accident while treating such cases.

Escaping conjunctivitis of the new-born, the next care should be to protect the infant's eyes from too bright a light. The child should not be allowed to face a bright light, whether from a window or lamp, and when old enongh to be taken out in the baby-carriage its eyes should be protected from the sun by a shade of some kind. It is not an uncommon occurrence in the street to see a child in a carriage not only with a nurse girl, but frequently with the mother, with the sun streaming directly into its eyes.

Simple catarrhal conjuctivitis may be the immediate result of such carelessness. The symptoms in the child are the same as in the purulent form, only modified, and should have the care of a physician. The same may be caused by sudden changes in the atmosphere, exposure to cold or heat, wind or any irritation from particles of dust in the eye. Living in poorly ventilated rooms, and excessive use of the eyes may produce it. In adults, beside the objective symptoms given above, we also get the subjective symptoms of heat, and itching and a feeling of sand or sticks in the lids. If severe, we may find a sensitiveness to light and watering of the eyes.

Non-catarrhal conjunctivitis is caused in a similar way and the symptoms are similar, only that there is no secretion. In children and adults, in addition to the causes enumerated above, may be added a refractive error in the eye, requiring glasses accurately adjusted by a physician to relieve the symptoms.

Pustular conjunctivitis occurs most frequently in children of a feeble scrofulous tendency with an exceedingly nervous temperament, especially where they live in poorly ventitated rooms and are

under-fed. There is generally a history of repeated attacks. On examining the eye, a small pustule is noticed generally near the edge of the cornea, from which extend blood vessels radiating like a fan away from the pupil. If attended to in season, they generally last but a few days, but if allowed to progress they may terminate in an ulcer and be quite persistent. Home treatment should not be trusted.

Granular conjunctivitis is so named from the little granulations, like tapioca grains, on the inner surface of the lid. It may be either acute or chronic; usually the latter. As a result of the granular surface rubbing the eye, the cornea may after a time have the appearance of ground glass, and the sight be affected in proportion to the opacity.

Measles and scarlatina often effect the eyes. One of the earliest symptoms of measles is conjunctivitis. It may take either the non-catarrhal, catarrhal or purulent variety. Frequently after recovering from these diseases the eyes are very susceptible to the light and easily tired. A common remark heard by physicians and nurses is that "I have not had good eyes since I had the measles." This need not be in the majority of cases if the eyes are properly protected from the light during the disease.

It is during infancy and childhood that much permanent injury is done to the eyes, and neither parent nor nurse should allow the first intimation of disease to go unattended by the family physician, who ought to be able to decide whether any special knowledge of this class of disease need be sought.

* * *

The Aims and Incompetencies of Opticians.

The following from the *Medical News* is so pregnant with truth that we think it will bear repetition.

"Every optician in the United States (except, perhaps, as many as can be counted on the fingers of one hand) is cock-sure of his ability to prescribe for ametropia as well as any physician. Not only this, but the optician (with few exceptions) attempt to dose whenever opportunity presents. Further, their single trade-journal is encouraging this delusion, and enthusiastically urges the establishment of optician schools, wherein the non-medical optician shall learn to relieve the medical profession of all care of the eyes, except as to disease and surgery.

As the treatment of ametropia and hypermetropia constitutes about nine-tenths of the oculist's work, this has bearings worthy of con-

sideration. As absolutely every pair of spectacles worn has a medical, and possibly a most serious medical significance, to the wearer, and as (with few exceptions) no non-medical opticians ever prescribed a proper pair of lenses (the writer has in thousands never seen a single instance), the fact becomes quite significant. It is exactly as if the truss makers and instrument makers should combine to take ont of the hands of the surgeon all cases of hernia and spinal disease, and should urge that to them should be left the decision as to whether a case of rupture or of Pott's disease needed a surgeon or not. Just as every case of spinal curvature needs the surgeon's attention, so does every case of ametropia or heterophoria, and it is downright and criminal quackery to permit the present method. If the opticians only knew how to do their own proper work, their pretensions would be less exasperating; but (with few exceptions) one cannot find, from any American optician, a spectacle bridge and frame sufficiently rigid and heavy to do its medical work; never a simple piece or ear curve having the remotest likeness to the shape of the back of the human ear; never an adjustment, such as corresponds to the wearer's peculiarity of face and labor. Of the spectacles worn by the American people (and heaven knows our opticians are better than those of foreigners) 999-1000 show about the same mechanical and artistic skill and intelligence that is shown by a five-year old schoolboy's first slate-picture of a horse."

* * *

Headaches. The relief by the proper adjustment of glasses of many cases of headache should prompt one to relieve all possible eye-strain before resorting to internal treatment. Above all should be avoided the so-called nostrums lauded by every pharmacist. No physician who does refraction work pretends that all headaches are due to eye-strain but the increasing number relieved from year to year indicates that a larger proportion are due to this scource than to any other.

* * *

Splendid Sight. Riding in the cars recently while in conversation with a fellow passenger he remarked what splendid sight he had and that if a fly was on a lady's shawl in the other end of the car he could easily discern it. He was rather doubtful when he was told that he might do that and still have very defective sight. In fact no one knows whether they have splendid sight or not until it has been tested by some standard. "As a man thinketh so is he" does not apply to the sight always.

School Children's Eyes. Following the law enacted in several of the states should be another requiring the examination by a competent physician of the eyes of every child when admitted to the public schools. At present in some schools a simple examination is made with the test card by the teacher, but as the teacher's knowledge is necessarily limited in this line of work in many cases a little knowledge becomes a dangerous thing. Many a child is relegated to the dunce's block simply on account of imperfect sight.

* * *

Other People's Glasses. The practice of wearing other people's glasses is extremely injurious. It should not be done any more than wearing another's false teeth. One may seem more cleanly than the other but both display equal ignorance. The teeth would be as likely to fit as the glasses. In response to the query, "have you ever worn glasses?" how frequently we hear, "no, only a pair of my mother's or aunt's, or a pair I found in the house." They are worn in too many cases long enough to do serious damage.

* * *

Can't Afford it. This is a common expression of many in reference to having their eyes examined. Generally it is from those who are dependent on their eyes for a livelihood, and they are the ones who above all others can not afford *not* to have it done. The mass of people will look out for other parts of the body but when it comes to the eye they seem to divorce that from the rest and trust it to every novice. This is what they can *not* afford to do.

* * *

Future Numbers. The August number will contain an article by C. A. Wood, M. D., of Chicago, on "With Emmetropia possible in both Eyes what Portion of the Ametropia shall we Correct?" The September number will contain an article by C. W. Hawley, M.D., of Chicago, on "Do Weak Lenses Benefit Patients?"

THE REFRACTIONIST.

The Exponent of the Refraction World.

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WITH EMMETROPIA POSSIBLE IN BOTH EYES WHAT PORTION OF THE AMETROPIA SHALL WE CORRECT?

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FOR many years past the greatest diversity of opinion has obtained as regards the amount of the refractive error to be corrected in a given case. Some oculists order, in the higher degrees of ametropia, a full correction for reading and a partial one for near work, while some are for ordering in every instance a full correction of the error in both eyes, while others never order more than the manifest amount. Some neutralize one-half of the total myopia. Some have a sort of graduated scale with reference to both myopia and hyperopia. Some regard the correction of astigmatism as an uncertain experiment, and still others follow rules for the correction of the various kinds of ametropia as complicated and apparently as difficult of application as the system of the gambler who aspires "to break the bank" at Monte Carlo.

I am acquainted with some ophthalmologists, for whose judgment generally I have the greatest respect, who set themselves to overcome the patient's hyperopia and hyperopic astigmatism in much the same way that siege was formerly laid to a medieval fortress. A preliminary survey of the outworks is made when the amount of the manifest error is calculated. This consumes a good deal of time and patience and is not always satisfactory since observation parties are not allowed to approach very close to the inner fortifications, and are in the nature of things liable to be deceived by a number of

circumstances. Next a cycloplegic is used (which, to carry out the simile, means that plans of the fortifications are cunningly obtained) and the true state of things is unmasked. Then the enemy is driven within his first line of defence by ordering, just as soon as the effects of the cycloplegia have worn off, as large a percentage of the total hyperopia as he will accept. Finally after the siege has lasted two or three months an assault is made by land and sea and sometimes the works capitulate; sometimes the patient's total error is found to equal his manifest, often it falls short of it. In any event he is ordered only what is manifest.

Surely we ought to be able to accomplish the end in view by a method less complicated, less expensive and less wasteful of time than this. Personally, I have earnestly sought for some definite rules, founded upon well known laws of physiological optics, whereby one could readily determine how much, if any, of the total ametropia should be corrected in a given case. In common with other ophthalmologists I have waited for satisfactory answers to certain questions—queries which every practical man is asking himself to-day.

Why do some myopes gratefully accept a full correction while others having the same kind and amount of error, refuse to wear the prescribed glasses? How is it that certain patients obstinately reject a full correction of their hyperopia? On the other hand, why do some having apparently the same refractive condition find their troubles promptly relieved by the same prescription?

What are we to do with patients who refuse all corrections and why do they act in this unseemly manner? Have we any means of deciding beforehand whether a patient will accept a full correction of his refractive error? If uncomfortable at first, will he eventually obtain relief? If so, how long will the struggle continue?

What amount and kind of work will the ametrope be able to do? Shall he give up book-keeping and take to raising vegetables in a market garden? Had the scholar better return to school at once, or should he wait until next term—next year? Will he be able to enter college in the autumn? Will he ever be able to do hours of continued near work at night? These are a few of the numerous and important questions, the answers to which, in every case, we should be able after a few examinations to supply with considerable accuracy.

The key to these problems is furnished, to my mind, by the following proposition and by what may be termed a corollary to it:

A condition of ametropia converted by means of glasses into a state of absolute emmetropia is the most effective for all kinds of eye work, as long as every portion of the visual apparatus as well as the general health are in a normal condition.

Advocates of some particular system of dealing with refractive errors, in which partial corrections play an important role, speak of "making the patient comfortable" as if that were the chief end of their work. It seems to me that we should aim rather to provide our patients with glasses, if they need them at all, that will give most aid and satisfaction *in the long run*, even at the expense of a little present discomfort.

If this first proposition be admitted, it naturally follows that when the full correction of a refractive error has been given and the patient continues to complain of asthenopia or reflex symptoms of ocular origin, we may with almost absolute certainty, assume that the trouble lies chiefly or entirely without the dioptric system.

Bearing these two theorems in mind, let us consider some of the conditions present in persons whose ametropic eyes (although potentially emmetropic) refuse to accept a total or it may be, even a partial correction of their errors.

The condition of the ciliary muscle. It is alleged with much plausibility and show of authority, that the ciliary muscle is almost entirely responsible for the refusal of the eyes to adapt themselves to the new order of things brought about by the total correction of myopia, hyperopia and astigmatism.

The classic pictures of Iwanoff (Handbuch der ges. Augenh. 1 p. 271 *et. seq.*) have long been the comfort and refuge of those who teach the partial correction dogma. They, as everybody knows, show, first of all, the annular, radiating and meridional fibres of the ciliary muscle, as seen in the emmetropic eye.

Secondly, a hypertrophied wedge of circular fibres is pictured, said to be characteristic of hyperopia. The muscle in myopia is depicted as having its circular fibres altogether or almost entirely wanting, while its meridional layer is unusually well developed. This argument from the anatomical standpoint would be unanswerable if all cases of well marked hyperopia or myopia rejected a complete correction, but the fact is that a large percentage of patients exhibiting these errors almost immediately accept a full correction of them, are grateful for it and do not require to return for additional examinations of their eyes and changes in their glasses.

Possibly the third or radiating group of ciliary fibres gives to the atrophied set all the assistance needed to carry on the work of focal adjustment under the new conditions until other parts of the muscle are properly developed through exercise. In any event I am firmly convinced from observation of and experience with such cases, that while weakness of accommodative effort is occasionally a serious bar to fully correcting certain refractive errors, its importance has been much over-rated. The ciliary muscle usually adapts itself very readily to displacements, both of the accustomed near and far points, provided other parts of the eye are in their normal state.

Landolt, speaking of the relative amplitude of accommodation and convergence in ametropia, remarks that in myopia the amount of the accommodation remains lower than that of convergence, while hyperopia calls for more convergence, and yet there often exists such a latitude in the relation between the two functions, that binocular vision is realized and maintained with comfort, provided always that innervation and the muscular power are normal.

Heterophoria—This is probably the most common obstacle to the speedy realization of comfortable emmetropia, and a full correction of any considerable refractive error should never be attempted without first estimating the relative strength of the extrinsic ocular muscles.

Where, for example, a patient does not accept a full correction of his myopia or hyperopia, the fault is much more likely to reside in weak externi or interni than in any condition whatever of his ciliary muscle. It seems to me that in dealing with the eye muscles we are prone to rely for our information regarding their functions more upon empirical results obtained by the use of phorometers and other instruments rather than upon calculations deduced from a study of physiological optics. Surely it is more satisfactory and more scientific to have an every-day acquaintance with the relations of the meter-angle of Nagel to the amplitude of accommodation than to possess many measurers of heterophoria.

The fact that both convex and concave glasses exert a direct influence upon convergence-efforts led Norton and Savage to lay down certain rules of conduct for dealing with refractive errors in the presence of muscular anomalies. I quote from the latter writer some observations on this subject, based on a study of the relationship between convergence and accommodation.

We have in these studies an attempt to explain why, in a large

number of cases of ametropia, the production of absolute emmetropia is abhorred by certain eyes and gratefully received by others. "The ciliary strain necessary for the correction of 1 D. to 3 D. hypermetropia is more kindly borne by the nervous system in many cases of exophoria, than would be the pseudo-exophoria which the correcting lenses would engender. Thus there is a reason for making no corrections at all, or only a partial correction of hypermetropia, in certain exophoric cases.

"Who has not seen one or many hypermetropes wearing comfortably concave lenses who could not bear the use of convex lenses? Such cases have always been exophoric. At first—probably from one to several hours—a mydriatic, in hypermetropic eyes, will increase the esophoria, will lessen an exophoria or convert it into orthophoria or even into an esophoria. All tests for lateral heterophoria are wholly unreliable within the first few hours after eyes have been brought under the influence of a mydriatic. Esophoria depending on hypermetropia solely is wholly relieved by advancing years, as well as by glasses that fully correct the focal error. It is also relieved after the first few hours by the use of a mydriatic, and this relief continues with the continued use of the drug.

"*Deductions.* Give a full correction of hypermetropia when associated with esophoria. (2) Give no correction or only a partial correction of hypermetropia when associated with exophoria. (3) Give a full correction of myopia when associated with exophoria, and when there is orthophoria. (4) Give only a partial correction or none at all of myopia, when associated with esophoria. (5) A full correction of hypermetropia cures a pseudo-esophoria in esophoric cases, and creates a pseudo-exophoria in exophoric cases. (6) A full correction of myopia cures a pseudo-exophoria in exophoric eyes and creates a pseudo-esophoria in esophoric eyes. (7) In hypermetropia associated with internal strabismus, fully correcting lenses aided by mydriatics remove all pseudo-esophoria and thus make it possible for the guiding sensation to resume control of the converging centers in such a way as to restrain the true esophoria, and thus cure the strabismus. (8) In myopia associated with exotropia, fully correcting lenses with myotics, will remove pseudo-exophoria and thus make it possible for the guiding sensation to restrain the true exophoria and thereby cure an external squint. (9) Any test for lateral heterophoria within the first few hours after beginning a mydriatic is wholly unreliable, even with lenses on."

In another place the same author attempts to formulate a working rule for the correction of oblique astigmatism. I have little experience of its operations, but I can easily believe that in the total correction of this form of error, the condition of the oblique muscles is an important factor.

"Steele's rule for placing the axes of correcting cylinders in oblique astigmatism would be perfection itself if the oblique muscles were always harmonious.

"This rule is, in those cases in which the axes of the proper *convex* cylinders for the two eyes diverge, place the cylinders at those points which will give the axes the greatest divergence permitted by the tests; and in those cases in which the axes converge, place them at the points which will give them the greatest convergence permitted by the tests. By substituting *least for greatest* and *vice versa*, the same rule applies to *concave* cylinders.

" 'There is no rule without exceptions,' applies to the Steele rule, but the exceptions in this instance should have only a temporary application. That the reason for these exceptions may be clearly understood, it may be stated that in any form of uncorrected oblique astigmatism (hypermetropic, myopic or mixed) if the meridians of greatest curvature diverge above there is consequent strain on the superior oblique muscles; if these meridians converge above there is then, necessarily, strain on the inferior oblique muscles. If in any of these cases the strain is on the superior oblique muscles (meridians of greatest curvature diverging above) and these muscles are insufficient (cyclophoria superior) Steele's rule holds good, but if in this condition the inferior obliques should be insufficient (cyclophoria inferior) the rule should be reversed temporarily. Again when the meridians of greatest curvature converge above and there is cyclophoria superior, Steele's rule for placing the axes of the cylinders must be reversed for the time, whereas if there is cyclophoria inferior the rule should be followed."

In all the above cases, where a partial correction is advised, that course of action is counselled in view of the insufficiency of certain muscles, but as Savage points out, *the proper thing to do under the circumstances, is to first cure the heterophoria (which may itself be one cause of the asthenopia) and then give a full correction of the refractive error.* Failing that, we shall at least have a reason for deviating from the better practice.

Age. A very slight acquaintance with the work of the ophthal-

mologist is sufficient to teach us that it is sometimes difficult to persuade the middle aged hyperope or myope to accept a total correction of his refractive error, a difficulty not frequently encountered in dealing with younger patients. *The habit of years* is not to be overcome in a day, whether one deals with the ciliary muscle or with other organs. Doubtless, also, the new and unaccustomed innervation-impulses required to regulate the changed relations between accommodation and convergence growing out of a full correction, are generated with about as much cerebral effort as are modifications in the contour of the lens controlled by those undeveloped ciliary fibres, whose contraction we may suppose to be necessary for effective vision. In practice, however, the eyes and the nervous system, other circumstances being favorable, shortly adapt themselves to the improved state of things in the great majority of cases.

Anisometropia. Even where with glasses vision is normal in either eye, the patient may not obtain binocular vision for near or distant work, because he has acquired the habit of using one eye to the exclusion of the other, and may promptly refuse a full or indeed any correction that makes more distinct the dulled image of the second eye. There are no problems in ophthalmology that requires more patience, more experience, and better judgment for their successful solution than those presented by the refractive anomalies of anisometropes and far too little is said about them in works on refraction. This is not the place to discuss any of them except to say that, *ceteris paribus*, as good results are obtainable by fully correcting the error in both eyes, as by any other single method of procedure. Where relief is not obtained by this method or where annoying symptoms are engendered by it we must not hastily jump to the conclusion that the refraction of one eye only should receive attention, or that a partial correction should be given on one or on both sides. It may easily happen that the trouble is traceable to parts of the visual apparatus not concerned in direct vision. This should be remedied, if possible, so that both eyes may receive the benefits that accrue to the emmetropic state.

Diseases of the fundus. The question in refraction sometimes is *not* what percentage of the total error we shall neutralize but whether we shall order any glasses at all. There are cases in which the condition of the coats of the eyes is such—even where the patient has centrally a full acuity of vision in both eyes—that one cannot conscientiously be a party to any considerable use of them by ordering

any sort of glass. The presence of choroiditis, a beginning optic nerve atrophy, a hyperaemia of the discs, a history of glaucomatous attacks, and a dozen other circumstances indicates the need of rest from work combined with other treatment, after or during which, the refractive error may be corrected when it is urgently called for. In such cases the oculist will, as a rule, probably find it wise to correct only the manifest error.

Occupation. While it is stating a very elementary law in ophthalmology, to say that the kind and amount of work should influence the selection of the lenses to be worn by the patient, it is also true that other factors are of paramount importance, and should not be lost sight of.

What difference does it make to a myopic engraver of 5 D. whether he is ordered a full correction, a half correction or no correction at all if he wishes to do his work at, say, 20 cm., and cannot command therewith the necessary number of meter angles of convergence? Or if he has, or can easily induce a choroidal congestion or suffers from acute dyspepsia? What about the typewriter who does her work with a poor illumination or who is so anemic that she cannot walk up a flight of stairs without having an attack of temporary heart failure?

Field of binocular fixation. Even when there are, as there should always be, normal amplitude of accommodation and a sufficiency of convergence for objects held in front of the eye, some part of the field of binocular fixation may be contracted, and this contraction should influence the prescribing of glasses in patients like compositors, book-keepers, car-checkers and others who require to use their muscles in various quarters of the field, and at widely varying distances from the eye. Of course the condition and relative strength of all the extrinsic muscles should be examined that weak points may be guarded. The oblique muscles in such cases are often at fault and would be wise to follow Savage's rules for correcting refractive errors when cyclophoria is present.

Reflex Ocular Symptoms. Most observers, whatever their views regarding the correction of refractive anomalies when the troubles complained of are purely optical (blurring of print, temporary disappearance of words, etc.) seem inclined to favor a full correction of the error (usually astigmatism and hyperopia) in the headaches, eye pains and neuralgia that result from them. In the same way chronic blepharitis, conjunctivitis and other reflex local and general diseases

due to eye strain, demand not only fully correcting lenses but also the removal of any obstacle that renders emmetropia difficult.

Defective innervation of the eye muscles. Transitory and partial pareses. General diseases. These causes of muscular asthenopia are sometimes mistaken for true heterophoria, and are, in my experience, more common than is generally supposed. After doses of certain drugs, during convalescence from acute diseases, during attacks of indigestion and in affections that lower the muscular tone generally, there may be a transient insufficiency of the extrinsic ocular muscles as well as a decrease in the ciliary power. Transitory pareses following diphtheria, syphillis, excess of venery, etc., are often to be met with. Here the question is not one of glasses of any strength, but rather a building up of the system and treatment of the disease that originally brought on the muscular trouble. Apart from these considerations one finds an "irritable" condition of other parts of the ocular apparatus dependant upon a state of ill health not easy to define or to account for. For example, the ophthalmologist has no more embarassing symptom to deal with, whatever its origin, than insomnia. Patients suffering from sleeplessness are not grateful for glasses prescribed in accordance with anybody's rules, and one must approach such cases cautiously, and not promise too much, even when the refractive error is of high degree or the asthenopic symptoms well marked.

"Demandare e non udire
Aspettare e non venire
Stare in letto e non dormire
Sono tre cose da morire"

runs the Italian jingle, and the physician who sees many such cases will probably re-echo the sentiment.

One should not be led into prescribing glasses for minor errors of refraction or into treating slight degrees of heterophoria in the presence of any of the above mentioned diseases, or other well recognized sources of ocular irritation such as, for example, hypertrophic rhinitis, neurasthenia, dental disease, true neuralgia of the face and head, disease of the lids, sclera or lachrymal apparatus. If glasses must be prescribed it is perhaps better to give a manifest correction of the hyperopia, and a partial correction of myopia, pointing out to the patient that treatment of the accompanying disease is imperative before proper glasses can be prescribed.

The oculist who intelligently orders a full correction in cases proper for it, requires in the very nature of things to make himself ac-

quainted, not only with the condition and functions of the parts concerned in the visual act, but also of all portions of the organism. In so far as he does this he distinguishes himself from the optician or jeweller "who also sells glasses." Even his method of examination (*quoad* the state of the refraction) must be more precise and more carefully applied than when he decides to order a partial correction of the error. In this particular, it seems to me, he should always examine every patient with the oblique illumination and, through the dilated pupil, with the ophthalmoscope; he should always use a cycloplegic sufficiently strong to develop the total ametropia (homatropine and cocaine discs are effective in the great majority of cases where atropine is not especially indicated or cannot be employed), he should make himself perfect in the exercise of some objective method, skiascopy for example, of determining the amount of the refractive error and, last of all, he should employ every device possible to elicit reliable information from the patient during the subjective examination.

And when the prescription for the glasses is handed over there should be a distinct understanding between patient and prescriber as to the conditions under which they are to be worn, temporarily, for near work, for use on the street, whenever it may be. Such an understanding, arrived at in the manner indicated, will assist in removing the impression, not altogether confined to the laity, that glasses for a dollar and a quarter are about as good as those obtained on an oculist's prescription.

103 East Adams Street.

WHAT A GENERAL PRACTITIONER SHOULD KNOW ABOUT DISEASES OF THE EYE.

By ROBERT FIELDS LeMOND, A.M., M.D., Denver, Colo.
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THE line which directly divides the work of the ophthalmologist and a general practitioner has been variously drawn and is by no means a definitely settled question now. A great many practitioners of medicine claim that a man should have a good general knowledge of all the ailments which the human family is heir to, and that such as call themselves specialists are nothing more nor less than persons who have a limited knowledge of medicine in any department.

But the majority, however, of the better thinking and better educated people are ready to admit that while medicine is one of the grandest fields which intellectual men enter, at the same time they admit that to encompass the whole field of medicine from "Dan to Beersheba" is simply an impossible thing for one human mind to accomplish.

I take the position that a physician should have a fair knowledge of eye troubles, especially those which are so threatening to the vitality of that organ, and it is reasonable to expect and require of him to know not only the apparent diseased condition, but also he should be able to make a proper diagnosis of such cases and to indicate the treatment at once and not wait and trust to time and providence to make the eye better, while at the same time the disease is encroaching on the eye and gaining a steady hold every minute it is allowed to go unmolested.

I think it is a matter of especial necessity that a general practitioner should understand how to make a diagnosis in early glaucoma from belladona poisoning; also from paralysis of the sphincter of the iris, and iritis and the different forms of conjunctivitis. I am liberal enough, however, to believe that a general practitioner should not be required to be proficient in anomalies of refraction and the various kinds of asthenopic troubles, or to be an expert with the ophthalmoscope, for these are sciences in themselves and require a great deal of study and practice to understand them properly. I call to mind a case of eye trouble which three physicians in a neighboring state were treating for belladona poisoning. As the eye did not improve under several weeks treatment, an ophthalmologist was called in to

the council and after making a careful examination of the eye told the gentlemen that it was glaucoma and demonstrated this fact to their entire satisfaction without the use of the ophthalmoscope.

It is very easy and simple to make a diagnosis of glaucoma without the use of this instrument, by observing the following symptoms, and if these are found present you can declare that it is a glaucomatous eye: first, increased tension; second, concentric rings around the light; third, dilatation of the pupil; and fourth, anesthesia of the cornea, with blurred vision. If you find any three of these symptoms present, you need not miss your diagnosis once in in five hundred cases.

I think generally practitioners should know more about eye troubles than most of them profess to know, because then, many who are suffering with eye troubles not very apparent to the casual observer, would be told of their condition and be referred to the ophthalmologist thereby proving a benefit to all, while on the other hand, many of these cases which are barely noticeable at first, go on until the disease, whatever it may be, gets such a hold on the eye that it may be maimed for life, if not entirely destroyed.

Example: I examined a lady a few days since who had hypermetropia and quite an amount of granular conjunctivitis, and she claimed that her eyes had grown worse gradually for eighteen years and had been told by her family doctor, who treated them, that her eyes were naturally weak and could not be cured. What folly! No well informed physician will tell patients affected like this one that they cannot be cured.

One might say that this would do away with the ophthalmologist. On the contrary it would increase his business instead of injurihg it. So far as refraction work is concerned, one cannot study it a little and then fit eyes to perfection. Various things have to be considered in the work, and one could do an ovariotomy or intubation with a little knowledge as well as fit properly hyperopic astigmatism.

Some claim that because our medical schools are advancing in their methods of teaching and exemplifying pathology in all departments of medicine, that the physicians of the present generation should understand all about the various troubles to which eyes are subjected as well as all other pathological conditions, but we must remember that while our methods of teaching are advancing, just at the same ratio is the field of medicine extended in all directions.

Selections.

Musicians' Eyes.*

No doubt the eye of man has become inferior to that of animals, and amongst ourselves it has fallen below the standard it had attained in some of the families of the human race. The neglect of the culture of the eyes, and of efforts to improve them, is chiefly due to the prevailing absence of notion concerning the proper range and scope of the visual function, and the power the eyes possess.

In most respects it may be said that the majority of parents have a fair knowledge of what ought to be the average powers and capabilities of children. They know, approximately at least, how far a boy of ten years old could reasonably be expected to walk, how high or how far he could jump, how fast he could run, what weight he could carry, what force he could exert. There is not one parent in five hundred who has the smallest notion how large an object, say a capital letter, a boy ought to be able to see at one hundred feet away. There is not one parent in five hundred who could tell whether his children possessed natural color vision, or who knows how to discover the truth.

All lesson-books for very young children should be printed in very large type, and children should be compelled to keep such books at a distance. Many of the school-books now in use should be abandoned, and new editions prepared in type of at least twice the size and twice the legibility. If public attention were once fairly directed to the question, if the eyes received as much attention as the muscles, and if an intelligent knowledge of what they ought to accomplish were diffused abroad, our country, in the course of two or three generations, would be peopled by a race who might engage, if not without fear, yet certainly without disgrace, in a seeing contest with any other representatives of the human family.

I am consulted every year by an appreciable number of young people who desire to render themselves proficient in music, and whose eyes are unequal to the strain which is thrown upon them I have no hesitation in saying that this strain is almost entirely due to the small size and the defective character of the type with which music is too often printed, and that it might be wholly relieved by

* Addressed to the Annual Conference Incorporated Society of Musicians, England, by Dr. Burdenel Carter.

proper attention being paid to much-needed improvement in these respects. There are very few eyes which see horizontal and vertical lines, of the same size and placed at the same distance, with absolute equal distinctness; and in a large proportion of people, the difference in apparent distinctness is considerable. When this is so it constitutes the visual defect which is technically called "astigmatism," and which, when present in excess of a very moderate degree, requires special glasses for its relief. I cannot say what is the proportionate prevalence of astigmatism in the population; but among 10,000 patients seen in my private consulting room, I found it present in such a degree as to require special glasses in 1,400. In lower degrees it is no doubt very common, and in some degrees probably almost universal.

No one who is sufficiently astigmatic to require glasses for comfortable reading of books should ever attempt to read music without them; but for the great majority of mankind, who do not require glasses, the reading of music might be made much easier than at present, and much distress as well as injury to the eyes would be obviated if reform in the following direction could be carried into effect:

In the first place, all music should be of fairly large size, say with a stave of not less than a centimeter in height; the lines of the stave and the vertical lines of the notes should both be blacker and better defined than they commonly are at present, and the oblique dark lines which indicates the value of the notes should be separated from each other by intervals equal to their own thickness. The figures to indicate fingering should not only be larger than is common, but the type for them should be cut with reference to distinctness, especially so as to bring into relief the difference between the top of a 3 and that of a 5, and to prevent a 4 from being mistaken for 1, on account of the fineness of the accessory lines. I have no doubt that if music were printed on the lines above laid down, much discomfort would be saved to many people, and serious injury to some.

Eye Paralyses.

A comprehensive article in the *American Journal of Ophthalmology*, on paralyses of the ocular muscles, concludes as follows:

1. All cases of lateral conjugate paralysis are of central origin.

2. When the paralysis is on the same side as other paralyses, the lesion is on the opposite side of the brain. Such paralyses, as a rule, are transitory, and follow almost any sudden lesion, and often only show themselves as a prevailing position of the eye, and not as a true paralysis, or even paresis.

3. When the paralysis is crossed with the paralyses below, the lesion is in the pons medulla region.

The above three conclusions are equally true of spasms.

4. A gradual development of conjugate paralysis clearly points to the region of the sixth nucleus of the same side as affected.

5. Paralysis of up or down motions, or both motions, indicates disease in the region of the corpora quadrigemina, at the point of exit.

6. Reasoning from analogy, paralysis of convergence points to disease in the central gray below the acqueduct, but as yet autopsies are lacking.

7. Picked paralysis of parts of a third nerve strongly suggests central disease, but is not proof of it.

8. A majority of cases of eye paralysis occur in the syphilitic.

9. A paralysis which changes rapidly, quickly showing fatigue, is probably central in origin.

10. Transitory paralysis in the syphilitic is strongly suggestive of future tabes.

11. An eye paralysis, however simple it may seem, is always a just cause of suspicion of trouble to come and demands a prompt and thorough examination of the patient.

12. There is no evidence that there is any form of connection between the sixth nucleus and the third, except in the cerebrum.

* * *

A *contracted pupil* calls for or justifies the use of atropine. A *dilated pupil* is a distinct warning against the use of atropine; since glaucoma is the only inflammatory affection excepting serous iritis, in which the pupil is found enlarged.—*Ex.*

BOOK NOTICES.

NOTES ON NURSING IN EYE DISEASES, by C. F. Jefferson, M. D., F. R.C.S.E. John Wright & Co., Bristol, 1894.

Ophthalmic work needs a nurse with special training. The prevailing idea that anyone can take care of eyes has resulted in blindness to many. This little book should be read by every one doing ophthalmic nursing. It contains ninety pages of practical matter.

* * *

REPRINTS.

"SPASTIC SENILE ENTROPION CURED BY CANTHOTOMY," from *N. A. Practitioner.*

"THE SPECTACLE TREATMENT OF HYPERMETROPIA." Chicago, Ill., *N. A. Practitioner.*

"THE RELATION BETWEEN THE EYES AND THE FEMALE GENITAL ORGANS," from the *American Journal of Obstetrics*, Vol. xxviii, No. 4, 1893.

"RIPENING OF IMMATURE CATARACTS BY DIRECT TRITURATION," from the *Journal of the American Medical Association*, November 4, 1893.

"SUBVOLUTION — A NEW PTERYGIUM OPERATION." from the *American Medical Association Journal*, March 24, 1894.

"THE TREATMENT OF BLENNORRHŒA NEONATORUM," Bettman, from the *Journal of the American Medical Association.* August 12, 1893.

All the above by Boerne Bettman, M.D., Chicago.

"PHLYCTENULAR CONJUNCTIVITIS" with special reference to the Pathology and Prophylaxis of the disease. Lewis J. Lautenbach, A.M.,M.D., Ph.D., Philadelphia, from the *R.I. Medical Science Monthly*, November, 1893.

"A CONTRIBUTION TO THE ANATOMY OF THE HUMAN RETINA," with a special consideration of the Terminal Loops of the Rods and Cones. By W. F. Norris, M.D. and James Wallace, M.D., Philadelphia, from the *University Medical Magazine*, March, 1894.

"THE PHYSICAL AND PHYSIOLOGICAL BASIS OF COLOR," James Wallace, M.D., Philadelphia, from *University Medical Magazine*, May, 1894.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I SEPTEMBER, 1894. No. 6

DO WEAK LENSES BENEFIT PATIENTS.

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"IT is the general experience that a hypermetropia of .75 D. or any degree of hypermetropia uncorrected to the extent of .75 D. can cause distress in many persons. But that a hypermetropic eye can appreciate a correction of half a dioptry or less will not be admitted by most observers. There is more diversity of opinion as to the amount of astigmatism which may require correction. While again, .75 represents the lowest cylindrical lens which is ordinarily of benefit, cases do occur, beyond doubt, in which half a dioptry of astigmatism leads to discomfort or headaches. Such cases, however, are exceptional and occur, as a rule, only when the general health is below par. It is true that cylinders of .25 D. are not only employed but highly recommended by a few prominent oculists, but they have as yet furnished no proof that such weak lenses benefit their patients. The majority of oculists have learned from their own experience, as well as the failures of the champions of .25 D. cylinders, that such weak lenses are of merely mythical value."—*Journal A. M. A.*, February 3, 1894.

The above quotation contains the pith of the whole editorial so far as the oculist is concerned. I believe the *opposite* to be true, especially that referring to .25 D. cylinders, and I think I can furnish some of the proof that is necessary to convince the editor, as he seems desirous of being convinced. The strongest proof would be a personal attempt on his part to deprive some of my patients of their glasses. Many of them had tried in vain to get relief by building up their general health, and came to the wearing of glasses as a last

resort; and not a few improved their general condition at once, and attributed the good result to .25 D. cylinders. So many experiences of the past in not appreciating little things and the regrets that have followed, seems to me should make us very careful when we doubt the efficacy of new procedures in the treatment of our ills. He who grew up in the past can hardly believe that the younger and more progressive element are getting the results they claim.

The present accuracy in the examination and correction of errors of refraction is so much in advance of ten years ago that even the layman is beginning to appreciate that the fitting of glasses means something more than going to a jeweler, looking through a pair of spectacles, leaving their money and soon finding out their disappointment. It has become much more exact since learning that many reflex ills are cured by a proper fitting pair of glasses. Not only must the error of refraction be properly worked out but the state of the muscular system of the eyes be taken into consideration. There is a great rage just now among pseudo-oculists and opticians, and even some very reputable oculists, of prescribing prisms on every chance discovery of a muscular insufficiency, and some of the attempts are very amusing indeed, they forgetting that many things must be taken into consideration before putting prisms before a patient's eyes. This fad is so prevalent that it has become a grave abuse of a useful therapeutic measure prescribed intelligently.

Several articles have appeared in answer to the above editorial in the *Journal of the American Medical Association*, but in the main they have been arguments on the part of writers and but little proof has been furnished that weak lenses do benefit their patients. I prefer, if the space can be allowed me, to bring out some facts and proofs of the faith I have in lenses of low degree. I do not propose to do so on my own arguments alone, but shall let my patients do their share of the talking whenever I can, and I will furnish the technical facts and connecting links. Some of my most brilliant results have been with .25 D. cylinders as you will see later on, and some of these have been on patients who have exhausted the general practitioner's resources for relief and some have been in the hands of oculists who cut the muscles for every reflex, and do not believe in lenses of low degree. Do not understand that I believe that every patient whose health is "below par" and having eye-strain will be cured by correcting the errors of refraction, but I do believe that it is the doctor's duty to eliminate that cause of irritation to the general

nervous system, and when he has done so he may find that his other measures to relieve may amount to something. The nervous system will then be in better control of the pathological conditions present. I believe it is just as essential to relieve the eye-strain as to give the patient rest by hypnotics, even if the correction needed is only temporary. But that there are many cases of ill health which are directly due to eye-strain no well posted or observing physician will deny; and I think and hope the day is not far distant when the general practitioner will more fully appreciate it. Now a good many think it an oculist fad to catch business, but what must be the feelings of that same physician when later on his patient falls into the hands of the "fad oculist" and he relieves him of the annoyance to which he has been subject so long, and that contrary to his physician's advice? I have known of many who have sent their patients to oculists, and the patients have returned without benefit simply because the oculist did not believe in correcting small errors of refraction; and so both patient and physician were skeptical, and no one can blame them for it either. But time and patience will correct all this as it has many another false impression.

I have tabulated 100 consecutive cases from my case book, giving the total error worked out under the use of cocaine and homatropine alkaloid discs, also the formulæ of the glasses worn. Analyzing these 100 cases we find: 14 per cent are wearing .25 D. cylinders only; 7 per cent are wearing .50 D. cylinders only; 6 per cent are wearing .75 D. cylinders only; 7 per cent are wearing cylinders above .75 D. before one or both eyes; 19 per cent are wearing .25 D. cylinder combined with .25 D. spherical; 11 per cent are wearing .25 D. cylinder before one eye alone and .25 D. cylinder with .25 D. spherical or plain glass before the other; 10 per cent are wearing .25 D. cylinders in combination with sphericals above .25 D.; 10 per cent are wearing .50 D. cylinders combined with some spherical; 5 per cent are wearing .75 D. cylinders combined with some spherical; 11 per cent are wearing different combinations before each eye, making it difficult to classify. Notice that of those wearing cylinders alone the greatest number are .25 D. Taking the next two items together, as for comparison they are really of one kind, and we have 30 per cent wearing .25 D. compound glasses.

		Under Mydriatic					Prescribed.		
		Vision.	* Spherical.	* Cylindrical.	Axis.	Vision.	* Spherical.	* Cylindrical.	Axis.
1	R	6-6	— .25 D	—.25 D	145	6-6		—.25	145
	L	"	— "	— "	55	"		— "	55
2	R	"	.50	.25	V	"	.25	"	V
	L	"	"	"	"	"	"	"	"
3	R	6-12	"	.50	135	"		"	135
	L	"	"	"	60	"		"	60
4	R	6-6	.00	.25	H	"		"	H
	L	"	.25	"	V	"		"	V
5	R	"	0	0	0	0	0	0	0
	L	"	.25	.25	100	6-6	.25	.25	100
6	R	6-9	"	"	V	"		"	V
	L	6-18	"	"	115	"		"	115
7	R	6-24	"	"	H	"	.25	"	H
	L	"	"	"	V	"	"	"	V
8	R	6-9	"	"	"	"	"	"	"
	L	"	"	"	"	"	"	"	"
9	R	6-6	"	"	65	"		"	65
	L	"	"	"	115	"		"	115
10	R	6-9	1.25	"	V	"	.50	"	V
	L	"	1.50	"	"	"	"	"	"
11	R	"	.75	"	45	"	.25	"	45
	L	"	"	"	"	"	"	"	45
12	R	6-6	"	"	V	"	"	"	V
	L	"	1.	"	"	"	"	"	"
13	R	6-9	.50	"	120	"	.50	"	120
	L	6-0	0	0	0	0	0	0	0
14	R	6-9	.25	.25	125	6-6	.25	.25	125
	L	6-12	"	"	"	"	"	"	"
15	R	"	2.75	.50	V	6-9	1.75	.50	V
	L	6-18	2.25	.25	110	6-12	"	.25	110
16	R	6-9		"	H	6-6		"	H
	L	"		"	30	"		"	30
17	R	6-6	1.25	"	60	"	.50	"	60
	L	"	"	"	V	"	"	"	V
18	R	6-9	.50	"	115	"	"	"	115
	L	6-6	.75			"	.75		
19	R	6-18	"	.50	H	6-6	.25	.25	H
	L	6-12	"	"	H	"	"	"	H
20	R	6-6	.50	.25	120	"		"	120
	L	"	.75	"	60	"		"	60
21	R	6-9	.25	"	H	"	.25	"	H
	L	"	"	"	120	"	"	"	120
22	R	6-6	1.	"	V	"	.50	"	V
	L	"	1.	"	"	"	"	"	"

* Where no sign is used plus is understood.

		Under Mydriatic.				Prescribed.			
		Vision.	* Spherical.	* Cylindrical.	Axis.	Vision.	* Spherical.	* Cylindrical.	Axis.
23	R	6-6	.50	.50	V	6-6		.50	V
	L	"	"	"	V	"		"	"
24	R	6-12		— .50	135	6-5		—"	135
	L	6-9		— .25	45	"		—"	45
25	R	6-6	.75	"	V	6-6	.50	.25	V
	L	"	1.	"	V	"	"	"	"
26	R	6-12	3.25	.50	120	6-9	1.50	.50	120
	L	"	2.25	"	V	"	"	"	V
27	R	6-6	1.	.25	45	6-6	1.	.25	45
	L	"	"	"	135	"	"	"	135
28	R	6-9	.25	"	V	"	.25	"	V
	L	"		"	"	"		"	"
29	R	"	.50	"	"	"	.25	"	"
	L	"	"	"	105	"	"	"	105
30	R	6-6	.25	"	V	"	"	"	V
	L	6-12		— "	135	"		—"	135
31	R	6-36	2.25	1.	V	6-12	1.50	1.	V
	L	6-6	1.25	.50	"	6-6	.50	.25	"
32	R	6-18	.75	"	"	"	.25	.50	"
	L	6-12	.50	.75	"	"	"	.75	"
33	R	6-9		.25	150	"		.25	150
	L	6-6	.25	"	V	"	.25	"	V
34	R	6-9	"	"	45	"	"	"	45
	L	"	"	"	135	"	"	"	135
35	R	6-6	"	"	45	"	"	"	45
	L	"	"	"	135	"	"	"	135
36	R	6-18	—1.75	1.	20	6-9	—1.75	.75	20
	L	6-12	—1.	.50	160	6-6	—1.	.50	160
37	R	"	— .25	"	V	"	— .25	"	V
	L	6-18	— "	"	"	"	— .25	"	"
38	R	6-9	1.	.25	45	"	.75	.25	45
	L	"	1.50			"	1.50		
39	R	"	.75	.50	135	"		.25	135
	L	"	"	"	45	"		"	45
40	R	"	.50	.25	V	"	.25	"	V
	L	"	.75	"	120	"	.50	"	120
41	R	6-12	.25	.50	30	"	.25	.50	H
	L	6-9	.50	"	H	"	"	"	"
42	R	"		.75	"	"		.75	"
	L	"		"	160	"		"	160
43	R	6-6	.50	.25	V	"	.25	.25	V
	L	"	"	"	"	"	"	"	"
44	R	6-12	.75	"	60	"	"	"	60
	L	"	1.25	"	120	"	.50	.25	120

* Where no sign is used plus is understood.

		Under Mydriatic.				Prescribed.			
		Vision.	* Spherical.	* Cylindrical.	Axis.	Vision.	* Spherical.	* Cylindrical.	Axis.
45	R	6-60	—1.75	— .25	H	6-9	—1.75		
	L	"	—1.50	— .50	70	"	—1.50	— .50	70
46	R	6-12	.50	.75	V	6⁴6		.75	V
	L	"	.25	"	"	"		"	"
47	R	6-6	1.50	.25	"	"	.75	.25	"
	L	"	1.25	"	"	"	.50	"	"
48	R	6-12	1.75	.75	95	"	.75	.50	"
	L	"	1.50	"	V	"	"	"	"
49	R	"	— .25	1.	"	"	— .25	.75	"
	L	"	— "	.75	105	"	— "	"	"
50	R	6-9	.50	.25	45	"	"	.25	45
	L	"	"	.50	135	"	"	"	135
51	R	"	1.50	"	110	"	.50	.50	110
	L	"	"	.75	V	"	"	.75	V
52	R	"	— .25	— .25	H	"	— .25	— .25	H
	L	6-12	— .75	— "	"	"	— .75	— "	"
53	R	6-9	.50	"	120	"	.25	"	120
	L	"	"	.50	V	"	"	.50	V
54	R	6-6	.25	.25	45	"	"	.25	45
	L	"		"	120	"		"	120
55	R	6-24	— .50	— "	H	"	— .50	— "	H
	L	6-60	— .25	— .50	160	6-18	—1.25	—1.25	160
56	R	6-6		.25	V	6-6		.25	V
	L	"		"	"	"		"	"
57	R	"	.25	.75	75	"	.25	.50	"
	L	"	"	.25	120	"	"	.25	120
58	R	6-18	.50	.50	135	"	.50	.50	135
	L	6-24	.75	"	45		.75	"	45
59	R	6-5	"	"	"	6-5	"	"	"
	L	6-6	"	"	135	"	"	"	135
60	R	6-12		— "	V	6-6		— "	V
	L	"	— .25	— "	"	"	— .25	— "	"
61	R	6-18	1.75	.25	"	"	1.	.25	"
	L	"	1.25	"	"	"	1.25	"	"
62	R	6-9		.75	"	"		.75	"
	L	6-12		"	"	"		"	"
63	R	6-18		1.25	75	"		1.25	75
	L	"		.50	120	"		.50	120
64	R	6-9	.75	.25	V	"	.50	.25	V
	L	6-6	.25	"	60	"	.25	"	60
65	R	"	1.50	.75	V	"	1.25	.75	V
	L	"	"	"	"	"	"	"	"
66	R	"	.50	.25	60	"		.25	60
	L	"	.50	"	120	"	.25	"	120

* Where no sign is used plus is understood.

		Under Mydriatic.				Prescribed.			
		Vision.	† Spherical.	† Cylindrical.	Axis.	Vision.	† Spherical.	† Cylindrical.	Axis.
67	R	6-6	— .50	.25	V	6-6		— .25	H
	L	"		— "	H	"		— "	"
68	R	6-9		— .75	"	"		— .75	"
	L	6-12		— "	"	"		— "	"
69	R	6-9	.50	.25	V	"	.25	.25	V
	L	6-6	"		"	"	"		
70	R	6-9	3.	.50	V	"	2.25	.50	V
	L	6-60	2.	2.50	95	6-9	1.	2.50	95
71	R	6-9	1.50	.75	V	6-6	.75	.75	V
	L	"	1.25	"	"	"	"	"	"
72	R	6-36	— "	1.50	"	6-18	— .25	1.	V
	L	6-24	—1.	"	75	6-9	—1.	1.50	75
73	R	6-9	2.25	.50	H	"	"	.50	H
	L	6-12	2.50	"	"	"	"	"	"
74	R	6-6		.25	45	6-6		.25	45
	L	"		"	135	"		"	135
75	R	5-6	2.	1.	V	5-6	1.	.75	V
	L	"	2.	.75	"	"	"	"	"
76	R	6-9		.50	"	6-6		.50	"
	L	"		"	"	"		"	"
77	R	"	.25	.25	H	"		.25	H
	L	6-6	"	.50	65	"		.50	65
78	R		—1.	1.25	30	6-9	—1.	1.25	30
	L			—1.50	155	"		—1.50	155
79	R	6-6		.50	V	6-6		.50	V
	L	"		"	"	"		"	"
80	R	6-18	—1.	— .25	H	"	—1.	— .25	H
	L	6-9	— .25	— "	"	"	— .50	— "	"
81	R	6-6	1.	.75	V	"		.50	V
	L	"	"	"	"	"		"	"
82	R	6-12	.75	.25	H	"	.75	.25	H
	L	6-6	.25	.50	"	"	.25	.50	"
83	R	"	.50	.25	V	"	"		
	L	"	"	"	"	"	"	.25	V
84	R	"	.75	"	60	"	"	"	60
	L	"	"	"	120	"	"	"	120
85	R	6-12		.75	75	"		.50	75
	L	6-6		.50	105	"		.25	105
86	R	"	— .50	.75	V	"		— .50	H
	L	"	— "	"	"	"		— "	"
87	R	6-18	.25	1.	"	"		.75	V
	L	"	.50	"	"	"		"	"
88	R	6-6		.50	"	"		.50	"
	L	"		"	"	"		"	"

† Where no sign is used plus is understood.

		Under Mydriatic.				Prescribed.			
		Vision.	† Spherical.	† Cylindrical.	Axis.	Vision.	† Spherical.	† Cylindrical.	Axis.
89	R	6-12	.75	.25	60	6-6	.50	.25	60
	L	6-6	"	"	120	"	"	"	120
90	R	6-24	—1.	1.75	160	"	1.25	—1.50	10
	L	6-18	— .25	"	10	"	.50	— "	100
91	R	6-6	1.	.25	V	"	.25	.25	V
	L	"	.50	"	"	"	"	"	"
92	R	6-24	"	.75	"			.75	"
	L	"	.25	"	"			"	"
93	R	6-12	2.75	1.25	"	6-6	1.75	"	"
	L	6-18	3.	"	"	"	"	"	"
94	R	6-12	— .25	— .50	H	"	— .25	— .50	H
	L	6-9	— .50	— .25	"	"	— .50	— .25	"
95	R	6-6	.75			"	"		
	L	"	"	.25	V	"	"	.25	V
96	R	6-9	1.	"	"	"	"	"	"
	L	"	.75			"	"		
97	R	6-18	.50	.75	V	6-9	.25	.50	V
	L	"	.25	"	"	"	"	"	105
98	R	6-9		.25	"	6-6		.25	V
	L	6-6		"	H	"		"	H
99	R	"		"	45	"		"	45
	L	"		"	135	"		"	135
100	R	6-18		— .25	H	"		— "	H
	L	"		"	V	"		"	V

† Where no sign is used plus is understood.

A study of some of these cases becomes quite convincing as to the utility of weak lenses.

No. 1 comes with poor health as well as poor vision. I was very skeptical about this patient receiving much benefit beyond the correction of her lowered vision. I put up for her the weak concave cylinders you see on the chart, and was much surprised a few weeks later to learn that she began to regain her former good health immediately she began to wear her glasses. In her case it seems to have been only the temporary use that was needed, for now she only wears them to assist her myopia. It is quite evident that the relief of the eye strain enabled her nervous system to so control the other organs as to enable them to throw off conditions present which were keeping her "below par."

No. 3 is a very peculiar and interesting case and illustrates our discussion exceedingly well. I have published this case once be-

fore, in an article on "Some Ocular Reflexes Other Than Headaches." Dr. S. was suffering from vertigo, and was under the care of a noted physician of this city who ascribed his trouble to "being below par," locating it especially in his stomach. He accidentally fell under my care, through a purely business matter, the result of which depended on his recovery from his vertigo. I asked him some questions about the dizzy spells, and his replies were: 1st, "that he became so when he tried to cross a busy street or when in a crowd; 2d, "that when he went into his room, if it were in disorder, everything would swim." I could see no connection between such attacks and any disordered stomach that I was familiar with, but I could see a connection between a busy street, a crowd and disordered room, and some error of refraction. He said that his stomach gave him no trouble. I suggested an examination of the eyes, and on working out his refraction found the following:

R. E. + .50 D. sph. + .50 D. cylinder, axis 135. L. E. + .50 D. sph. + .50 D. cylinder, axis 60. For some reason, I find I only corrected one-half of his astigmatism, giving him R. E. + .25 D. cylinder, axis 135; L. E. + .25 D. cylinder, axis 60; and from that day his vertigo disappeared. If .25 D. cylinders are of "mythical value," what helped this patient?

Now comes the very interesting verification of our diagnosis and treatment. I had just finished writing the above when, before the ink was dry, who should come in but this same patient, after having been absent more than a year, with a pair of broken lenses. He tells me that he has just recovered from a long sickness, followed by a very slow convalescence. Just before he was taken sick he broke the glasses, and on getting up started on a trip through the west for his health, consequently he has been without them for several months. For the past two months the vertigo has returned as severely as ever. Disliking to wear glasses, on his return to Chicago he consulted a noted neurologist, who could find no organic trouble, and advised him to return to me. This time I mended his glasses by ordering up his full correction, and he has since reported entire relief. This case alone fully justifies the claim that .25 D. cylinders can be appreciated by the eye, even when the total error is greater. I am quite sure the doctor will not be again persuaded to drop his weak lenses.

(Concluded in October number.)

DETACHMENT OF RETINA FOLLOWING A SIMPLE EXTRACTION OF CATERACT.

By DUNBAR ROY, A.B., M.D.
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THE question as to which is the best method of operation in cataract extraction seems to be by no means settled. The simple method and that with iridectomy have as many advocates on one side as the other. On one point, however, I deem that all ophthalmic surgeons agree, and that is that simple linear extraction without iridectomy is not applicable in all cases; nor is the after toilette and dressing of the eye the same with all operators, and I suppose these differences will exist so long as the world stands and operators desire to show their individuality. In Germany extraction with iridectomy is the rule; while in Paris, which is supposed to represent the French teaching, that without iridectomy is more in vogue. In London, according to my observation, operations with iridectomy are much more frequent than those without. While assistant two years ago on Prof. Sattler's clinic in Leipzig, all extractions were made with an iridectomy, and that was the teaching of Prof. S. himself. For my own part I am firmly convinced that the operation with iridectomy will give much more universal success than that without, and I believe also that those enthusiastic advocates of the simple linear extraction without iridectomy have not always kept trace of their patients to note the final result. The following case is reported to show a result which may follow a simple extraction and a result which, so far as I have been able to find, is not mentioned in the various text books nor in any of the statistical reports of cataract extraction, which I have at my command: E. P., a colored preacher 56 years old, presented himself at the eye clinic of the Southern Medical College on December 24 of last year, with a fully ripened serile cataract. On oblique illumination, and even direct, at the anterior pole of the lens the capsule and lens substance showed a very marked sclerosed condition, a color much whiter than the rest of the lens proper. The lens being deemed ready for extraction, it was accordingly removed the next day, December 25; cocaine, anæsthesia, fixation forceps and wire speculum used. A simple linear incision was made, coming out

above 1 mm. in the clear cornea; no iridectomy performed; after which the lens was removed without difficulty. Slight prolapse of iris followed, which was easily replaced; pupil round and clear; after which both eyes were tightly bandaged. There having been no pain, according to mo rule the bandages were not removed until the third day. Wound perfectly healed; no congestion, but the iris was seen to be adherent to the posterior lip of the corneal wound. From this time there was no further trouble, and on January 23, with the necessary correction, V $=\frac{6}{12}$, upper portion of the iris still adherent to the wound while the lower portion reacts perfectly to light. The patient now proceeded with his ministerial duties. On May 23, four months later, the patient again presented himself, stating that just one week before on rising in the morning he found that the operated eye was nearly blind, and has remained in that condition ever since. There had been no violent exertion on his part, nor had there been any pain. Up to that date the eye operated upon was just as good as the other. On examination I found V = fingers at 1 m., and that only when the head was turned in a certain position. On direct inspection no further changes could be discovered in the iris and pupil than what existed when the patient was last seen. By the ophthalmoscope no fundus reflex could be obtained except when the patient looked extremely downward. On closer inspection and with the aid of oblique illumination, it could be seen that the whole upper portion of the retina was detached. The patient was advised to rest in bed, keep the eye bandaged, and increasing doses of iodide of potash was ordered to be taken regularly. By no means unexpected since I knew the peculiar traits of the colored race, the patient did not return and have heard nothing from him.

The case in question speaks for itself without any further remarks by me. That the prolapse was due to the adhesions of the iris to the wound seems to me evident, caused by the fixed cicatrix pulling upon the ciliary body. The only mention of a similar case of which I am cognizant is by Dr. Roosa of New York, in his paper published in the *Archives for Ophthalmology*, Vol. XX, in which he gave the various results obtained by him in two hundred and six cases of extraction. In one case only, a very intemperate old man, there was a detachment of the retina nine months after the operation. Prof. Scholer of Berlin, in a report of five hundred and forty-nine extractions in the last *Archives*, ought certainly to find a unanimity of

agreement among ophthalmic surgeons, when he says, "it must certainly be admitted that peripheric adhesions of the iris to inner (posterior) lip of wound and also more central attachments, happen more frequently after simple extraction than incarceration of the columns of the iris in extraction with iridectomy."

* * * *

Selections.

Obstructive Disease of the Lachrymal Passages. A large class of cases exists characterized chiefly by epiphora without catarrhal or purulent secretion, in which the obstruction of the lachrymo-nasal duct depends upon swelling of its mucous membrane, and not upon true stricture. The primary origin of these cases in the great majority of instances is a chronic or subacute post-nasal catarrh. The evident indication is the treatment of the latter condition and the medication of the swollen mucous membrane of the lachrymo-nasal duct, so that it may regain as nearly as possible its natural condition, which it will do without much instrumental interference—an interference that may of itself, if unskillfully performed, be the cause of a cicatrizing band that never originally existed.

The life history, if I may so express myself, of many cases of obstructive disease of the lachrymo-nasal duct and the formation of a lachrymal abscess is: First, a chronic pharyngitis, later, hypertrophy and inflammation of the intra-nasal mucous membrane, followed by swelling of the lining tissue of the lachrymal duct. Gradually cicatricial changes arise, and a true stricture is formed. The drainage of the conjunctival cul-de-sac ceases; the micrococci natural to the part, and those which readily find access to this region, permeate the contents of the lachrymal sac because this can no longer be emptied; the pathogenic micro-organisms exercise their true function, and suppuration occurs.

A number of cases develop, chiefly in old people, in which there is epiphora, again without the presence of pus or muco-pus, depending upon obstruction in the lachrymal duct from atrophic changes, the whole being part of a similar atrophic process in the intra-nasal

passages, and generally described under the term atrophic catarrh. The obstruction in these instances is not from swelling, not from stricture, but from contraction.

A very common cause of an exacerbation of lachrymal disease is due to the pressure of a hypertrophic turbinated body, or similar intra-nasal obstruction, which under treatment has gradually subsided, but which, owing to exposure, swells up again, and exercises its obstructing influence. At once there is occlusion of the lachrymal passages and recrudescence of the symptoms.

In every case of local disease the physician should be mindful of constitutional causes; local treatment may be very necessary; local treatment without general medication is ineffectual.

Finally, I come to the class of cases in which there exists an obstruction at the intra-nasal end of the duct (it may be trivial), permeable by the fluids used in a syringe, but an impassable barrier to the outflow of tears. Even the slightest obstructions, under these circumstances, may defeat the most classical treatment of lachrymal disease.

It has not been my intention to refer to what are the best means of treating lachrymal disease, except in so far as these are implied by the descriptions of the lessons which existed in the examples I have reported. Whether we believe that small or large probes should be passed; whether we class ourselves with those who believe that the probes should not be used at all; whether we are the advocates of this or that antiseptic and astringent fluid; whether we think that strictures should be incised or should not be incised, or whether we believe in the permanent wearing of styles or cannulas, it is evident that the rational treatment of certain types of obstructive lachrymo-nasal disease must also include not alone the ordinary intra-nasal treatment with sprays and powders, but a systematic and thorough examination of the naso-pharynx, and, if necessary, the best operative interference known to intra-nasal surgery.—*G. E. DeSchweinitz, M. D., before the Philadelphia County Medical Society.*

* * *

The Use of Prisms.

Dr. Maddox gives the following maxims to be observed in prescribing prisms:

1. Never order them unless indications for their use are unmistakable.

2. Never order them simply on account of an anomaly in the

behavior of the eyes under various tests, unless there is asthenopia, headache, tendency to diplopia, or giddiness, possibly relievable by them.

3. Do not judge by one test, but by the "finger," "rod" and "card" tests, and if specially indicated by the relative convergence test also.

4. Remember that considerable latent deviation in distant vision is more important than in near vision (though the latter is not to be ignored), and that moderate divergence in near vision is physiological.

5. Always more or less under correct with prisms.

* * *

A New Way of Testing Eyes.

A prominent optician of N— O—, who has the habit of occasionally mystifying people, who are too loudly bragging about their skill in fitting glasses, played, not long ago, a nice joke on a Texas travelling "oculist," as he called himself. That gentleman was annoying the optician with a long yarn of his improved methods, but at last was interrupted by the entrance of an elderly man, an old acquaintance of the optician, who came for a new pair of spectacles. The optician at once saw his chance of repaying that Texas bore; so he took his watch in one hand, grasped with the other his customer's wrist, and with the most professional air seemed to count the pulse, while he looked steadily at his watch. After a few moments he said: "All right;" then he searched for the number which the man was lately buying of him (+ 5 diopters), and handed him the glasses and a newspaper. The man was well pleased, paid for the glasses and left the store.

The "oculist," who had attentively watched the whole transaction, at first gazed in bewilderment at the optician, then burst out: "Is that the way you test the eyes in N— O—? The optician, by the way a most jovial wag, replied with an earnest face: "I am astonished that you are so much behind in the refraction business, and do not yet know the latest departure in optics. The physicians have been feeling the pulse for many hundred years to ascertain the degree of fever, but they never thought that they could also determine the strength of needed spectacles by feeling the pulse, as you have seen it done this very moment.

"But, please, what connection has the pulse with the deficient

refraction of the eye, though I have seen with my own eyes, that there really must be some connection?" "Well, an educated man like you, the possessor of a diploma, should know that the pulse of a new-born child is about 120; at the age of eight years about 90; in adult life about 75, and that it gradually diminishes to about 50 a minute in old age. Do you see the point? We do not care any more for test-types, and the opthalmoscope, as long as our customers allow us to feel their pulse?

And the self-styled "oculist" left the store with a big flea in his ear, and hurried home to try the same experiment in Texas.—*The Optician.*

* * *

Headaches in Childhood.

1. *The Headaches of Growth.*—They are frontal, exaggerated by work, coincident with the pains of the joints, periosteum and cardiac hypertrophy. Treatment: Muscular rest, tonics, good food, phosphate of lime, beer and malt.

2. *Headaches from Mental Strain.*—The children are either very intelligent and excitable, working very hard, or, on the contrary, they are those of late mental development, who have difficulty in pursuing their studies. Treatment: In the first class of cases, cessation of mental work, physical exercise of all descriptions, without fatigue, and hydrotherapy; in the second class, a moderate amount of mental and physical exercise.

3. *Headaches from Digestive Disturbances.*—In children who eat too often, or too much, or too rapidly, appearing in from one to three hours after a meal. Treatment: Strict regulation of diet; one of the bitter tonics before meals, warm drinks after meals; treat the constipation.

4. *Nervous Headaches.*—This form is easily recognized. It includes the headaches of those that are irritated by their surroundings, persons as well as circumstances; our future neurasthenics, epileptics, or hysterics. Treatment: Short douches, exercise, massage, valerian, aconite, and antipyrin for the hysterical patients; belladonna and the bromides for epileptics. Avoid colds.

5. *Rheumatic and Gouty Headaches.*—These are sometimes accompanied by intense congestive phenomena simulating meningitis They are recognized by their hereditary antecedents, by being associated with other pains--neuralgias, arthralgias, myalgias; the urine contains a great quantity of phosphates, oxalates and urates. Treat-

ment: Moderate feeding, exercise in the open air, Russian baths and rubbing; laxatives, alkalies, salicylate of sodium in doses of from .25 to .30 gm.; tincture of colchicum, gtt. 10 to 15 daily.

6. *Headaches of Anæmia and Intoxication.*—In the first instance as the result of a lack of fresh air, bad hygiene; in the second, by malaria, carbon monoxide, excessive medication (iodine, opium, digitalia and belladonna). Treatment: Remove the cause.

7. *Headaches Produced by Lesions of Nerves of Special Sense.*—In the eyes: chronic conjunctivitis and keratitis, to be treated locally, and with large doses of quinine; troubles of refraction, like hypermetropia and astigmatism, to be relieved by proper glasses. In the nose: polypi, hypertrophy of the turbinated bones, to be treated locally. In the ear: adenoid vegetations, otitis, foreign bodies in the external auditory meatus.—*Columbus Med. Journal.*

* * *

Indications for Enucleation of an Eye.

1. The presence in the eye of a malignant new growth, as glioma, sarcoma, or tuberculosis. This indication is imperative, no matter how much vision the eye retains.

2. The presence in the eye of a foreign body, with irido-cyclitis. If the injury be recent and the inflammatory process still active, and the patient cannot remain under observation, an eye with anything less than thoroughly useful vision should be sacrificed.

3. The presence of a foreign body in a blind eye.

4. Blindness with diminished tension of the eyeball, following perforation either by traumatism or corneal ulcer, most urgent after traumatic perforation of the exposed portion of the sclera.

5. Blindness the result of irido-choroiditis without perforation of the eyeball, if the patient cannot remain under observation.

6. Sympathetic inflammation, provided the exciting eye does not possess vision sufficiently good to be weighed against the chances of the sympathizing eye.

7. The actual presence of sympathetic irritation; not the risk of it, unless the patient is likely to be out of reach of surgical aid.

8. Persistent pain in a blind eye, sufficient to annoy its possessor or tempt him to the use of analgesic drugs.

9. Serious disfigurement of a blind eye, even if free from pain or risk of causing sympathetic disease.—*Dr. Edward Jackson in the Polyclinic.*

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DO WEAK LENSES BENEFIT PATIENTS.

BY CLARK W. HAWLEY, M.D., CHICAGO, ILL.

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[*Concluded from September number.*]

No. 5 came complaining of headaches and pains in the eyes while at close work, left eye becoming congested, especially the lids, when she used them much. The R. E. was normal, but the left was hypermetropic and astigmatic one-quarter of a dioptre each. I gave her the full correction for that eye and plain for the R. E. Several months later she reported herself completely relieved of headache and eye trouble of any kind. She returned to her school work and wrote that she could not possibly do without the spectacles now that she had experienced relief.

No. 9 complained of headaches and tired feeling in the eyes and squinted badly, an infallible sign of astigmatism. From the severeness of the symptoms I expected to find considerable of an error, and was surprised to find only this: R. E. +.25 D. sph. +.25 D. cyl., axis 65; L. E. +.25 D. sph. +.25 D. cyl., axis 115. I only prescribed the cylinders, and will give you her own words as to benefit: "I take pleasure in saying that the glasses you fitted to my eyes about eighteen months ago are of great benefit to me. They seem to fit perfectly, and are all I could ask for."

So far the cases have been among grown people, but No. 10 is a child of eight years. My case-book says (Sept. 26, 1892): "Nervous, irritable, headaches, blepharites; could not attend school on

account of same." R. E. +.75 D. sph. +.25 D. cyl., axis 45. L. E. +.75 D. sph. +.25 D. cyl., axis 45. I ordered R. E. +.25 D. +.25 D., axis 45; L. E. +.25 D. +.25 D., axis 45. Three days later the mother called with the child, and the improvement was marked even that early; less nervous and no headache. Again, on Nov. 21, mother called and said the improvement was wonderful, headaches gone and nervousness markedly better. This case was so interesting that I have kept track of it, and the last report came from the mother lately, when she sent in the broken glasses to be repaired. She says: "Her lids were sore and chronic matter on them all the time, and that disappeared with the use of the glasses, and she has not complained of headaches since." It seems too bad to put glasses on such a young child, but they were of such benefit that it compensated.

No. 11. A girl 12 years old complained of headaches and eyes troubling her in school. On working out her refraction I found this: R. E. +.75 D. sph. +.25 D. cyl., axis 90; L. E. +.75 D. sph. +.50 D. cyl., axis 90. I ordered the following for constant wear: R. E. +.25 D. +.25 D., axis 90; L. E. +.25 D. +.25 D., axis 90. The correction was so agreeable that if she left them at home she would get excused from school and return home for them. The mother remarked that while before she was constantly complaining of head and eyes, she now does not hear from her on that score.

No. 13 is another case of vertigo and headaches; general health good; this was on October 17, 1892; found the left eye amblyopic. The full correction of the R. E. is +.50 D. sph. +.25 D. cyl., axis 120, and same was ordered. On Nov. 1, 1893, reported as very much improved, the dizziness having disappeared and no headache since wearing the glasses.

No. 14 complained of headaches and eyeache at close work. R. E. +.25 D. sph. +.25 D. cyl., axis 125; L. E. +.25 D. sph. +.25 D. cyl., axis 125; which was ordered for constant use. Some months afterwards I heard from this case in this language: "I send you my broken glassss; please hurry them back, as I cannot do without them."

The next case that I shall call your attention to is also a striking example of the use of very weak lenses, No. 15. A young lady had been suffering for a number of years with recurring corneal ulcers, and had been under the care of an oculist who did not believe in .25 D. cylinders, having given her +1.25 D. sphericals to wear, but no re-

lief from the ulcers. Her general health was very good, and I could find no constitutional cause for the ulcers. Fortunately they would occur to one side of the centre of the cornea, but the last one came very near the pupilary space. On working out the refraction, I found the following total error: R. E. + 2.75 D. sph. +.50 D. cyl., axis 90; L. E. + 2.75 D. sph. +.25 D. cyl., axis 110, and gave the following for constant wear: R. E. + 1.75 D. +.25 D. cyl., axis 90; L. E. + 1.75 D. +.25 D., axis 110, which she has been wearing for two years with perfect comfort and no return of the ulcers, as had been the annual case before. It might be suggested that the correction of more of the hypermetropia had much to do with the improvement, but I do not think it had as much influence as the correction of the small amount of astigmatism with its irregular axis in the eyes. I imagine it would be very difficult to convince her that her spectacles are of "mythical value."

If weak cylinders are of no value, how can we account for the following. No. 16 says: "Glasses have been of great benefit and suit me first rate; have had no more headaches, and do not get dizzy spells any more only when I leave them off." She is wearing R. E. +.25 D. cyl., axis horizontal; L. E. +.25 cyl., axis 30, or nearly horizontal. This patient complained of a peculiar dizziness, not like No. 3, when in a crowd; but when she looked at a piece of cloth with figures on it, like calico, or at wall paper, everything would swim. The last time I saw her she said she would have the same old trouble if she looked at such things without her glasses, which would disappear immediately on putting them on again. Surely the eye can appreciate .25 D. cyl. in this case as that is the total error. You might argue "below par" very earnestly, but you would have great difficulty in getting her to give up her glasses. You could hardly have a more convincing proof of the appreciation of weak lenses by the eyes.

No. 18 is a patient from the Pacific coast, who complained of trouble at close work, and had used a pair of weak sphericals to relieve the ciliary muscle, but without benefit. I put up the following for him, and it illustrates every contention at the head of this paper: R. E. +.50 D. sph. C.+.25 D. cyl., axis 115; L. E. +.75 D. sph.

You see he appreciates a +.75 D. spherical in the left eye, and a weak spherical and a .25 D. cylinder in the right. The glasses he had been wearing were .50 D. spherical, and as they did not relieve the trouble and the former did, I think we must conclude that the

.25 D. cylinder was the beneficial factor in this case. I am so firmly convinced from experience with a number of very similar cases that had I only prescribed the .25 D. cylinder and plain for the left he would have received the relief he sought. Time will not permit my entering into a discussion of the reason why weak cylinders benefit my patients; it is the fact that we are trying to show.

To illustrate how sometimes very small things, even smaller in appearance than .25 D. cylinders effect patients, I will give you this patient's experience with his glasses. When he arrived home he found that his eyes still pained him, especially one, which, I have forgotten. I suspected it was because the pupilary distance was not accurately adjusted. I had him mark where he looked through the lenses, and I found one eye was one millimeter out of the correct position. Correcting and returning the glasses, he reported that then they were perfect.

No. 21 is wearing R. E. .25 D. sph. .25 cyl., axis 180; L. E. .25 D. sph. .25 D. cyl., axis 120. Here are her own words about them: "They have cured my headaches from the start, and they return if I go without my glasses for a day or two. My sister Katie younger was also relieved from headaches, and she sometimes goes without her spectacles for a day or so and then the old headache returns, which is relieved in less than a half hour by putting on the glasses again." The sister is wearing the weakest of cylinders, and is in perfect health otherwise: R. E. +.25 D. cyl., axis 90; L. E. +.25 D. cyl., axis 90. Her headaches were not the usual frontal kind, but occipital mainly.

No. 17, a boy 9 years old, brought to me suffering from blepharitis and some conjunctivitis, and complaining of his eyes hurting him when at study. The blepharitis and conjunctivitis were purely reflex to a small error of refraction. I found the total error to be: R. E. + 1.00 D. +.25 D., axis 90; L. E. + 1.00 D. +.25 D., axis 90. On telling the mother that a pair of glasses would effect a cure, she objected very strongly to a cure by that method. I then informed her that I could give him temporary relief, but that he would be back in less than a year; and, sure enough, about a month ago he came back worse than before. This time the mother consented to allow me to cure him by relieving the cause of trouble, and I gave him the following for constant wear: R. E. +.50 D.+ .25 D., axis 90; L. E. +.50 D. +.25 D., axis 90, and he has reported several times since as being entirely relieved.

No. 24 is a bookkeeper and so using his eyes constantly. Eyes were red and inflamed most of the time. I put up his total correction and he reported complete relief, wearing R. E. —.50 D. cyl., axis 135; L. E. —.50 D. cyl., axis 45.

No. 28 will talk for himself and I will only give the prescription I gave him: R. E. + .25 D. + .25 D. cyl., axis 90; L. E. + .25 D. cyl., axis 90. Total error, and wearing same for close work only.

"My glasses have been a great help to me. Before I got them I had headaches almost constantly, but now I am not troubled with them at all. I am doing a great deal of night work; at school during the day and keep a set of books at night; so I have given the glasses a good test. I work over my books from 5 until 10 p.m., and then study until 12 p. m., and don't remember having a headache since I put them on." Certainly there could be no better proof that small errors effect one seriously. Have not these weak glasses been of great benefit to this patient?

No. 29, a school teacher, complained very much of her eyes. She was in perfect health in every other way. She is wearing: R. E. +.25 D. +.25 D., axis 90; L. E. +.25 D. +.25 D., axis 105. In her own language she tells you how she feels about weak lenses: "Before using my present glasses I suffered very much with my eyes. Whenever I looked at one thing intently, especially when reading, I experienced pain in my head immediately over my eyes. In reading the letters always seemed blurred. Since wearing these glasses I have not been troubled with my eyes at all, except when I remove the glasses. Sometimes I go without them, but am compelled to put them on the minute I return. They have helped me wonderfully." It is unnecessary to say more in regard to her case. She tells it all.

No. 33 will also tell her own story. It is another case of very weak lenses. "Before securing my glasses my eyes were the first to give out after any exertion and would ache badly. They would seem to be standing most every way but straight. Now, when at work, I never feel the least strain on my eyes, and I am inclined to believe that the trouble is gradually leaving. I also think that comfort will overcome vanity, and that when a person's eyes are troubling them they should at once seek the oculist for relief, and in most cases relief means glasses."

No. 40, a newspaper man, using his eyes constantly. His total

error is: R. E. +.50 D. +.25 D., axis 90; L. E. +.75 D. +.25 D., axis 120, and is wearing R. E. +.25 D. +.25 D., axis 90; L. E. +.25 D. +.25 D., axis 120. Let us hear what he has to say: "For nearly a year I had had daily recurring headaches in the forehead and eyes, coming on about noon and frequently lasting all night, also great drowsiness in the evening. The use of the spectacles brought immediate and swift relief from headaches, and the drowsiness disappeared soon afterwards."

No. 53 had very hard headaches for years. She could hardly believe it due to her eyes, and had tried every remedy suggested by her physicians for indigestion without benefit. Friends urged her so strongly to have her eyes looked after that she finally consented, and on wearing R. E. +.25 D. +.25 D. cyl., axis 120; L. E. +.25 +.50 D. cyl., axis 90, found complete relief. Eight months later she broke them, and in her letter asking to have them repaired said, "she had had no more headaches," and very urgently requested me to "hurry them back as she could not go without them one day without suffering." If such cases are due to lowered bodily condition how is it that instant relief is given, and very quickly pain returns when the glasses are withdrawn. The trouble was constant before the glasses were worn; every means had been employed to find relief, which only came through wearing the weakest lenses we prescribe.

Because many persons are able to go through life and not suffer, though they may be the possessors of quite an error, is no reason that every individual with a small error should do so. There is undoubtedly a vast difference in the nervous sensibility of different individuals. One man can sit down and have a tumor removed from his cheek and make but the slightest evidence that he suffers pain, while the same operation on another person apparently similar in every way would be impossible. I believe it hurts the latter more than the former. True there may be some difference in what we call "sand" between the two, but I am thoroughly convinced that it is not so much the lack of "sand" as that it actually hurts one more than the other. One nervous system will stand the ciliary strain due to .25 D. errors without manifesting reflex troubles, while the same error in connection with another nervous system causes many serious reflexes. To say that weak lenses are of no benefit and limiting the grade of error that is annoying, is like limiting the size of a sliver in the finger that might be troublesome. I have one patient

who had been to two oculists and could not be satisfied until I added to the prescription of the last .12½ D. cylinders, when they were just the thing. I was very skeptical indeed myself, but she insisted that the addition of the cylinders certainly did give the relief she wanted.

All of the cases here presented had tried to find relief by eliminating every other possible cause for their suffering and came to me as a last resort, so that if they were benefited by the lenses and are still continuing under the same conditions in the use of the eyes as before they got such weak lenses, I think we are justified in giving .25 D. lenses the credit for the improvement. It would be the greatest nonsense to cast the glasses one side and go fishing for some unknown cause to lay it to.

By the addition of a case, report of which came in since this article had progressed thus far, I will close, hoping that I have not wearied you beyond endurance with a "fad." I think reasonable proof has been given that weak lenses do benefit our patients, by the articles that have been called out by the editorial quoted.

No. 77 talks thus about her glasses—R. E. +.25 D, axis 180; L. E. +.50 D, axis 65: "I received my glasses Monday morning. I did not realize how much benefit they were to me until I was compelled to go without them for three days. Occasionally I do not put my glasses on for two or three hours in the morning and then my head feels dull, but is relieved when I put them on again. Was also bothered very much with hay-fever, and my glasses seemed to almost effect a cure of that." In regard to the "hay-fever" this much of an explanation is necessary: While her mother was away, just at the middle of her "hay-fever season," though it had passed its commencement time without appearing, she was compelled to be in her mother's kitchen a great deal, and as the steam annoyed she laid the glasses aside for two days, when on came an attack of "hay-fever." Thinking that the removal of the glasses might have something to do with its appearance, she put them on again and the "fever" at once disappeared as mysteriously as it came.

70 STATE STREET, CHICAGO, ILL.

THE ERRORS OF REFRACTION FOUND IN FOUR THOUSAND EYES.*

By H. S. MILES, M.D., Bridgeport, Conn.
Clinical Assistant Manhattan Eye and Ear Hospital, New York; Assistant Surgeon Eye and Ear Department, Bridgeport Hospital.

I AM able to present to you today facts and conclusions based on a large number of cases; most of them are from the records of Dr. F. M. Wilson, with whom I am associated and who kindly put his history cards at my disposal for this purpose. Nearly one half the cases that come to us are purely refraction, and as each patient is examined an average of two and a tenth times, it becomes a very important part of our work. Some of the cases are from those that I have myself examined at the Manhattan Eye and Ear Hospital. I expected to collect even more than four thousand, but found that so much time had been consumed with these that I was unable to tabulate others before this meeting, having examined only to M in the cards.

Only cases were taken where no disease had been recorded that could affect the vision; if the patients had beginning cataract, opacities of cornea, or any pathological changes in the media or fundus, they were rejected; nor does this list include presbyopes, unless they had an additional defect.

The details of the cases required nearly a hundred pages of foolscap. Besides what I am about to give you I noted the exact vision without glasses and without a mydriatic, then with glasses and without a mydriatic, and where atropine or hyoscyamine had been used the vision with these, without glasses and again with, the correcting glasses were recorded and the glasses prescribed; also, if changes were made later, the duration of symptoms and the results of treatment when possible. The following are our summaries:

We find that 76 per cent, or 3045 eyes, were hyperopic or farsighted. It was proven by Dr. E. T. Ely, in 1879, that the majority of newly-born children are hyperopic, 72 per cent of the babies he examined were, and probably most of us remain more or less so through life. It is surely true that people who have symptoms do. There are among this list 787 myopic eyes, about 20 per cent,

* Read before the Fairfield County (Conn.) Medical Association, October 9, 1894.

and 106 of mixed astigmatism, eyes hyperopic in one meridian and myopic in another, generally due to uneven curvature in the cornea. In 16 cases one eye was far-sighted and the other near-sighted. There were 62 patients with one eye having an error, and none found in the other eye. Of the 3045 far-sighted eyes 2384 were simply hyperopic with no astigmatism, 442 had hyperopic astigmatism, while 219 had hyperopia added to hyperopic astigmatism. Of the 787 near-sighted eyes 454 were simply myopia, 182 myopic astigmatism, and 151 compound myopic astigmatism. There were 341 cases with presbyopia added to their error.

Concerning the vision: it was markedly different in the two eyes in 337 cases, and a slight difference occurred in 408, while it was equal in 1255, or 63 per cent; where a great difference is present the patient is often not aware of the fact, especially if one eye is normal or nearly so. In over one-quarter of the cases the vision was normal or better in both eyes, still 312 of these 518 needed glasses.

The whole number of patients given glasses was 1303, 65 per cent, leaving 35 per cent that did not receive them, either because it was not thought advisable or because they already had their error corrected, or perhaps they did not return for their final examination. When we consider that in 1482 cases there was some fault in the acuity of vision, and that many of the remainder probably came expecting glasses, I think you will agree with me that 65 per cent is conservative treatment.

Of the 341 cases of presbyopia 113 were fitted for distant as well as near vision. In 19 cases where glasses were prescribed a plane glass was put in front of one eye, either because that eye was without error or because the vision could not be made good enough for both eyes to work together. Prisms were combined with correcting lenses in 15 cases. The accommodation was temporarily paralyzed by atropine or hyoscyamine in 280 cases, or 14 per cent.

As with other bodily ills we find here that the number of women and girls affected far exceeds the men and boys. In our list are 1351 females, 67½ per cent, and 649 males; 768 of the women were single and 583 married.

Regarding age we find the following: The youngest was 2 years, the oldest 80; there were 71 under 10 years, 395 between 10 and 20, 528 between 20 and 30, 369 between 30 and 40, 350 between 40 and 50, 182 between 50 and 60, and but 84 over 60. There were 23

cases without age recorded. From this we see that the period during which people have the most trouble with their eyes, or at least attend to them, is that between 20 and 30, for we have 528 cases; from 10 to 20 next to the greatest number, though there is little difference between second, fourth and fifth decades.

The symptoms complained of are numerous and varied, though at first they usually say they cannot see well, or their eyes ache, or they have headaches. Very many say their "eyes are weak!" "Weak eyes" includes so much that we always ask them what they mean. And they will explain by telling us that their eyes pain or get tired easily; they smart, they burn, run water and blur; some come simply because their eyes are red, and count this the chief trouble; many complain that light hurts them; a few see sparks, flashes of light, and balls of fire; some see what they call specks or spots before their eyes. The less common symptoms include itching, blinking and twitching of lids. Five came because of dizziness, three complained of nausea, two had car sickness, one vomiting, three had had epileptic fits, one said everything looked wavy; but aside from the fact of not seeing well, the vast majority complain of pain on use, or eyeache or headache.

Many things have to be considered in getting the proper relation between symptoms and the giving of glasses. It is surprising to observe how little trouble some patients have with errors of high degree, and on the other hand how a very little hyperopic astigmatism, for instance, will cause the patient the greatest misery. So it often becomes a nice point to decide when to give and when not to. We have to judge by the amount of trouble and its duration, the occupation of patient and the general health, as well as what we learn from our examination, and, least of all, what many people pu first, the age.

There were among our cases 86 squints, of which 71 were convergent and 15 divergent; 13 of them were cured by glasses without an operation, 14 were given glasses without an operation and the result not recorded, one was given glasses which did not correct, but the patient disappeared before an operation was performed, 39 were straightened by an operation but given glasses in addition, 11 were operated upon and the result not recorded, 3 were operated upon with partial success, 5 were not treated either by operation or glasses. There were 55 squinting girls and 23 boys, showing that the muscles of females are weaker or that parents look after them more, or both·

36 cases had decided insufficiencies of their muscles, though not amounting to squints. There was recorded a mild conjunctivitis in 86 cases, 35 had blepharitis, 17 chalazia, 10 styes.

These cases were an interesting study to me, covering, as they do, a period of sixteen years. Many things can be learned from examinations repeated after a lapse of considerable time. We can see how myopia progresses and how astigmatism sometimes changes; we watch presbyopia come on; we see how prisms relieve symptoms after lenses alone have failed, and many other interesting facts. Among the things that struck me forcibly while getting together these statistics was that so many, over 25 per cent, had normal vision in both eyes for distance; of these 39 were presbyopic and complained of blurring with near work, leaving 479 most all with perfect sight for near and far, yet consulting us because of headaches of various kinds (frontal, supraorbital, through temples, occipital or general), or they had aches and pains in their eyes, and 312 of these needed glasses for relief.

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M.D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Physicians and Commissions.

A late number of the *Philadelphia Polyclinic* contains an abstract of a paper by H. A. Wilson, M. D., on "Can Physicians Honorably Accept Commissions from Orthopedic Instrument Makers?" As he touches also the optical side we feel that much that he says applies to those physicians whose relations with opticians are of such a nature that it leaves doubt in the mind of the public. It matters not whether a direct commission is received, or whether an understanding exists between the physician and optician, that if the physician sends his prescriptions to the optician the optician will send his difficult (?) cases to the physician. The latter method is probably the one most adopted (tacitly it may be) in our large centers. Both are equally open to severe criticism.

Dr. Wilson says: "The enterprise of manufacturers in increasing the sales of their goods is called business thrift, for their relationship to patients is a purely commercial one. Under the guise of being made especially for this patient, they are often enabled to charge exorbitant prices for their inexpensive wares so as to pay the secretly understood customary commission to the physician.

"Dr. Solomon Solis-Cohen applies the very appropriate term of 'sales-agent' to physicians who thus debase their profession, as to the recommendation of secret nostrums. He says: 'When a sick man applies to a physician, thinking that he thereby will secure the benefit of special knowledge brought to bear upon the conditions of the individual case, entrusting to the conscience of his medical ad-

viser, his health and his life, he is entitled to the skill and the though for which he pays and that he deems himself to be receiving. He certainly deserves better treatment than to be handed over to the mercies of —— or any other of the unholy crew. If such is to be his fate, let him have the satisfaction of buying the worthless or poisonous stuff direct, without the sham of a professional consultation, and without paying a purchaser's commission to the medical sales-agent.'

"The very secrecy that is resorted to condemns the procedure, for the mannfacturer well knows that this form of business thrift on his part is a dishonest practice on the part of the physician. The form of bribery which induces physicians to send their patients to 'our store' for personal gain is strongly condemned by the profession, whether it be commissions from the apothecary, the optician, the manufacturer of proprietary or patent medicines, of health-giving natural spring waters, artificial limbs, trusses or orthopedic apparatus—but, notwithstanding this condemnation, it appears to be still carried on."

Of the dozen or more so-called opticians of Boston we can specify where no small part of them send the cases that apply to them under the ignorant idea of an optician's qualifications. So long as this exists we shall have opticians sprouting up like toadstools. All that is necessary is to lay in with some physician who is as anxious for business as the optician. It remains with physicians to remedy the abuses slowly but surely encroaching on the work of the refractionist. Has the time come to organize the American Refractionist Society? Suggestions are invited from *you*.

* * *

System. The arrangement of a refractionist's cases so as to refer to them readily is a great saving of time. For some years we have used the card system and it is all that could be desired. We give below a sample card. It shows which part is regular form and which is filled in. These cards are filed in library style alphabetically. On the reverse of the card is written the history of the case in such a way that when the card is tipped towards us on the rod that the writing comes plainly in view. The cards thus arranged are convenient for classifying work. We can give

terms on application, to those wishing to use this system, on cases complete with cards sufficient for one thousand patients and upwards.

No.	Age.	Name.	Residence.
Date.		*R. V.*	
		L. V.=	
Under Mydriatic		*R. V.=*	
		L. V.=	
Ordered. Dist.		*R.*	
		L.	
Near.		*R.*	*R. No. J. at in.*
		L.	*L. No. J. at in.*
Oph. Ex.	*R.*		*L.*
Diag.			*Referred by*

* * *

Mutual Help. The November number will contain an article on "The New or Dioptral System of Measuring and Designating Prisms Employed in Ophthalmic Practice," by Swan M. Burnett, M. D., of Washington, and read at the Edinburgh Congress. We urgently invite any one having articles which would be of interest to our readers to forward them for publication. THE REFRACTIONIST can be made a success only by the co-operation of those engaged in like work, and is intended as a medium for such articles. Every month we reach a large number of general practitioners, and the interest shown by them indicates the effect that such a journal may have in raising this branch of medicine in their esteem and confidence. What may be old and commonplace to you in your work is new to many of the profession who are trying to become informed on refraction work.

Selections.

A Combination Test for Color Vision.

My original intention with regard to the telechrome was to supply a reliable method of testing the color perception for colored lights —as distinct from colored fabrics—in candidates for marine or railway service who had succeeded in passing the Holmgren wool test, which alone I consider to be insufficient; for it has been shown that some persons who are able to acquit themselves creditably when subjected to examination with wools are yet unable to recognize colored lights. As first constructed the telechrome was entirely an additional, a supplementary test. This meant that additional time was needed to conduct the complete examination. To obviate this objection I have recently made some improvements in my instrument which enable the surgeon to combine the wool test with the lantern test, and so to examine the candidate completely as regards color-vision at one single operation. For this purpose the telechrome is fitted with a disk carrying colored glasses which (with gaslight) show the following colors: 1, pale grass-green; 2, pale rose; 3, bright red; 4, bright blue; 5, signal green; and 6, yellow (gaslight). One of the principal features of the instrument was the lever arrangement, which allowed the operator rapidly and unexpectedly to vary the luminosity. I consider this a most important point in any lantern test, because a color-blind man who is aware of his defect can often learn to recognize the color for which he is blind by the fact that with equal illumination it appears to be less bright to him than its complementary color. With an instrument in which the luminosity is constantly being varied there is no fixed standard of comparison and therefore no chance of a man being able to deceive the examiner. In using the new pattern of telechrome the *modus operandi* is as follows: The lantern is placed in a somewhat darkened spot (a closet, a passage, or at the end of a metal tube) fifteen feet from the candidate, who himself remains in daylight with a set of Holmgren's wools on a table beside him. In rotation the test colors are shown in the telechrome with various de-

grees of illumination, and he is required to pick out the skeins of wool which match each of the telechrome colors, irrespectively of shade. A man who has defective vision for either the colored lights or the colored wools will be completely incapacitated from performing the task set him and will be at once detected. No further test is necessary.

"I may add that a 'fogging glass' is still provided, and that it is useful in reproducing the effect of a colored lamp as it appears when seen through mist. In the railway telechrome the perspective segment has two apertures, one representing the perspective of a railway lamp at one hundred yards, the other at one thousand yards. In the marine telechrome the apertures represent the perspective of a ship's light at one hundred yards and two miles respectively."—*A. St. Clair Buxton in The Lancet.*

* * *

HEADACHE.

WHEN FROM NASAL STENOSIS.	WHEN FROM EYE STRAIN.
Generally unilateral.	Generally bilateral.
Frequent insomnia, often worse in the morning.	Sleeps soundly; improved after sleep.
Aggravated by physical exertion, as running, stooping, etc.	Aggravated by mental application and using the eyes.
Not subject to conjunctivitis.	Conjunctivitis after prolonged use of eyes.
Generally nasal catarrh.	Catarrh not complained of.
Excited by acute coryza.	Not subject to acute coryza.
Nose not suspected by patient.	Eyes believed to be the cause.
Dyspepsia and nausea.	Appetite and digestion good.
Astigmatic chart test negative.	Same test generally affirmative.
Pressing middle turbinated with probe increases.	Same test negative, except to cause sneezing.
No photophobia.	Sensitive to bright light.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I NOVEMBER, 1894. No. 8

THE NEW OR DIOPTRAL SYSTEM OF MEASURING AND DESIGNATING PRISMS EMPLOYED IN OPHTHALMIC PRACTICE.

BY SWAN M. BURNETT, M. D., PH. D., WASHINGTON, D. C.

A paper read before the International Congress of Ophthalmology at Edinburgh, August 9, 1894.

IT has long been felt that in the matter of measuring and numbering prisms we are yet far behind that scientific accuracy which we have obtained in the employment of other optical instruments of precision in ophthalmic practice. The use of the apex angle of the prism for giving number to and expressing the power of the prism is unscientific as well as inaccurate, since one necessary factor in the result—the refractive index of the glass—is left out altogether; and besides, it gives no comprehendable idea, except to the very expert, in regard to what we really want to know respecting a prism, namely, the exact amount of deflection it causes, any more than the radius of curvature of a spherical lens conveys to the uninitiated an intelligent comprehension of the actual power of the lens as expressed by its focal length.

We have rendered the nomenclature of lenses simple, scientific and easily understood, by means of the metric or dioptral system, and we should do the same for prisms, and in as nearly the same manner as possible, since their association in practice is very intimate and the scientific principles involved are identical, the lens being in fact only a series of prisms in combination.

The first step towards a reformation in prism nomenclature was proposed by Dr. E. Jackson at the Ninth International Medical Congress, held in Washington in 1887, and consisted in the recom-

mendation of the minimum angle of deviation instead of the apex angle as a basis of numbering. This is scientific and exact, it is true, but the difficulty in the way of readily and easily measuring this angle is an insuperable obstacle to its practical application, and besides it does not do away with the expression of deflections in terms of angles, which is not only confusing and unnecessary, but out of keeping with the system used in the nomenclature of lenses.

Dennett of New York proposed what he calls the centrad (based on the radian) in the place of the minimum deviation angle, at the meeting of the American Ophthalmological Society in 1889, and it was recommended by the society for adoption in 1890.

Prentice of New York offered, in 1890, (*Knapp's Archives*, Nos. 1 and 2), a system which applies the same optical principle to the prism as has been employed for the lens in the metric system now in universal use, that is, the deflection caused by the prism as measured on a plane at a meter's distance; and to be in uniformity with the metric system of measuring lenses, the unit or standard is a prism giving a deflection of one centimeter on this plane. This unit has been called a *prism-diopter* (P. D). A prism giving a deflection of two centimeters at this plane is two P. D.; one giving a deflection of one-half a centimeter is 0.5 P. D., etc.

This system leaves nothing to be desired as regards scientific accuracy, a definite and clear understanding of the work done by the prism, and ease in obtaining this information, since all that is actually required is a meter measure and a centimeter rule.

The simplicity and efficiency of this method of measuring the power of prisms at once attracted the attention of a number of investigators in the United States, and the question has been freely discussed by Jackson, Dennett, Randall, Prentice, myself and some others, with the result that the ophthalmological section of the American Medical Association, in 1891, recommended the principle for adoption, the adherents of the centrad system having agreed that for all prisms up to 20^{Δ} used in ophthalmology the measurements made on the plane are practically equivalent to those made on the arc. And it may be said that this is the system most commonly in use in America today *when prisms are measured at all as to their actual deflecting power.*

Moreover, the manufacturing opticians have been quick to seize upon the advantages offered by the system, and are doing what they can to further its introduction and adoption by the trade and the

profession. One of the two chief manufacturing firms in the United States—The American Optical Company—has announced that in the future all the prisms in its trial cases, and those which are furnished to the trade, will be measured and numbered strictly according to this new metric dioptral system; and the other large firm —that of Bausch & Lomb—has signified its intention of so doing. As these two firms supply most of the retail dealers in America, it is safe to say that in the very near future the prisms furnished on oculists prescriptions will, with rare exceptions, be measured and numbered in accordance with the dioptral system, whether they are ordered in degrees, centrads or prism-diopters.

Furthermore, it has been agreed among these manufacturing opticians and those of us who have been interested in the discussion and introduction of this reform (including, among others, Jackson, Dennett, Randall, Prentice and myself) to adopt the symbol $\underline{\Delta}$ in designating these prisms. The use of the old symbol of the degree (°) for the new dioptral system is evidently inappropriate since we have abandoned the degree in the measurement of prisms, just as we abandoned the radius of curvature in adopting the metric system in numbering lenses. Moreover, the degree is used in designating the axis of the cylinder in astigmatism, and by dropping it in the nomenclature of prisms we get rid of another liability to confusion and error besides gaining in scientific exactitude.

The appropriateness of the exponent Δ for prisms is still further emphasized by the fact that it is itself a prismatic figure and has the form of the Greek letter *delta*, which fitly symbolizes the entrance of the prismatic group into the dioptral ($\square$) system of optics, now in use by scientific ophthalmologists the world over.

The immediate adoption of this dioptral system into practice is rendered all the more easy by the happy circumstance that the prism-diopter differs but little from the degree as commonly understood and used, when the index of refraction of the glass is 1.5, which enables the opticians and oculists to use the stock of prisms now on hand when they shall have been properly numbered in accordance with the measurements of their deflecting power. It is thus a reform that can be instituted without any important revolution in existing conditions or methods of manufacture.

Of the advantages, scientific as well as practical, of this method it is not necessary to speak here in detail, since they have been already set forth at length in various articles published within the last

few years, a list of which is appended to this paper. Suffice it to say that its relation to the so-called meter-angle is much more logical and more easily comprehended than that of the degree, that its application to the prismatic effect of decentered lenses is more simple and more easy to understand and apply than any which has been offered, and that its principle is inseparable from the methods now in most general use in testing for all forms of heterophoria; and, finally, and above all, that it is the only strictly scientific system which is at all practical that has been proposed. These advantages are certainly much more than an offset against the alleged inconveniences of a change in nomenclature (which are after all very slight) that have been advanced by those who would cling to the old method because it has seemed "sufficiently accurate for all practical purposes." To these objectors the only proper reply is that in science approximations are never allowable when precision is possible, and that it is an inexcusably reckless position in any one who presumes to hold any advance, however apparently trivial, towards exactness, to be insignificant or unnecessary.

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The Refractionist.

A Journal of Practical Ophthalmology.

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Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Good Advice. Every refractionist should have some plain directions in printed form to give to his patients after prescribing for them. The following directions for the use and care of glasses, by Dr. Baxter, and used by him in his private practice, are practical and contain many points of value to the general practitioner: "It has been found that the best results from the use of glasses may be obtained if certain directions for their proper use and care are given and followed. It should be understood that glasses prescribed for eye-strains or headaches are *prescriptions*, and the directions for their use should be followed as carefully as those for the use of a powerful medicine; also that they should be prescribed by a *physician* specially educated in this branch of medicine, *the oculist*. It should be understood that glasses prescribed for eye-strain or headache—and these remarks apply to this class of cases—frequently like drugs, have to be changed before the exact correction to relieve the pain or nervous symptom is discovered, in the same manner that drugs have to be changed at times to relieve the same trouble in individual cases; for the eye is not an optical instrument that will admit the use of the same glasses in all similar cases, but each case must be fitted according to its own individual peculiarities; if this were not so patients could fit themselves as well as they could be fitted by the *oculist*. It must be understood that glasses prescribed when the eyes are under the influence of *belladonna*, must be worn constantly, and that if they be left off even for a short time the eyes frequently return to the state of spasm in which they were before the use of *belladonna*, and that frequently when the glasses

are resumed they will fail to give the former relief, but instead will do harm, unless the eyes again be treated. Glasses no matter how carefully fitted will not give the required relief from eye-strain unless they be retained before the eyes in a proper position. The frames should fit the face in such a manner that the *centers* of the lenses are in front of the *pupils* and the lenses should be as close to the eyes as the lashes will permit, the lenses must also be retained in a horizontal position, this is of especial importance in astigmatic lenses, for the *slightest tipping* from the horizontal may cause a return of the eye-strain; for this reason *eye glasses* are not suitable for astigmatic or prismatic lenses. It is necessary that glasses be changed from time to time, and that the eyes should then be again carefully examined, as changes take place in the eyes after the use of glasses, it is also to be remembered that the necessity for frequent change in many cases denotes serious eye trouble. The lenses must be kept clean with a little weak alcohol or ammonia solution on a soft cloth."

* * *

Recurrent Oculo-Motor Paralysis. Dr. P. C. Knapp, in the *Boston Medical and Surgical Journal* of Sept. 27, has an article on Recurrent Oculo-Motor Paralysis. He has collected and tabulated thirty-nine cases. The disease affects the two sexes about equally. The same nerve is always affected, and in the majority of cases the trouble began in early life. The attack is usually sudden, with nausea, vomiting and hemicrania, followed by paralysis of third nerve. After a period varying from one day to six months the paralysis partially or wholly disappears, but a second attack follows after a time varying from a week to four years. The ætiology is obscure. Prognosis grave. Treatment unsatisfactory.

* * *

Spasm of Ciliary Muscle. Dr. Fred Baker of San Diego, California, in the August number of the *Southern California Practitioner*, reports a case of spasm of the ciliary muscles not relieved by atropine. The spasm followed an injury to the spine, causing hemi-paresis. The amount of hyperopia covered by the spasm was .50 D. as evinced by careful examination before, five days after the injury under atropine and after recovery from the hemi-paresis. Symptoms before atropine:

Intense pain, great photophobia, congested sclerotics, excessive lachrymation, contracted pupils. Caused probably by irritation of the cilio-spinal centers. Complete recovery.

* * *

The Profession.

Dr. Briggs of the *Texas Health Journal*, has been spending the past year in New York and the principal cities of Europe studying the surgery of the eye, ear, nose and throat. He gives vivid descriptions of his work and the specialists he met in the various centers visited. If he does not wake Texas up in his specialty it will not be his fault. He strikes from the shoulder, and through the medium of the *Journal* he is endeavoring to show his readers that there have been advances made during the past twenty-five years, especially in the line of refraction, that the general practitioner would do well to heed. He is with us in placing all refraction work in the hands of the physician. His views on advertising are honest, and while we do not accept all, we believe that we are entering upon an era when the physician, if not protected by associations properly, must protect himself. Most of our organizations, from our state associations down through hospitals, dispensaries and boards of health, are managed by schools and cliques. As long as this continues the profession may expect to have the same lack of unanimity of feeling as pervades it at present.

* * *

THE third New England Conference of Charities, Correction and Philanthropy, was held at Newport, R. I., Oct. 10, 11, 12 and 13, 1894. In October, 1892, a Conference of Associated Charities and kindred societies in New England was held in Lynn, Mass., at the invitation of the local society. The attendance was so large, and the meeting so helpful, that it was voted to meet yearly, and to enlarge the scope of the Conference. This Conference aims to be a gathering of people interested in all kinds of charitable and reformatory work, public and private. They come together to learn from and teach each other about new and improved methods, to exchange opinions, to measure the results they have attained themselves by those attained by others, to give to each other the ripest fruits of their experience. The secretary, Eli W. Blake, Jr., 128 North Main street, Providence, will furnish circulars on application.

Annals of Ophthalmology and Otology.

The October number of the *Annals of Ophthalmology and Otology* (St. Louis) has reached us. This closes the third volume. It is published quarterly, and with the January number is to be enlarged and the price advanced to $5.00 per year. As usual it is replete with good articles. Dr. Casey Wood of Chicago, concludes his valuable article in this number on Toxic Amblyopias. This article has been running in the *Annals* for three years, and is the most valuable production on Toxic Amblyopias in the English language. It is to be published in book form and carefully indexed. The *Annals* contains a list of the "400" regular subscribers and representative men of the country doing special work. We trust that with the beginning of Vol. IV another "400" may be added to its list, as a large number of names of first-class men is still lacking. We con gratulate Dr. Parker on the success of the journal.

Selections.

Description of an Artificial Eye,* Intended for the Study of Ophthalmoscopy and the Objective Determination of Ametropia. As far as practicable, this model has been constructed in imitation of the human eye.

The contrivance is composed of two telescopic brass tubes of about four centimetres and a half in length and two centimetres and a half in diameter each. These are so constructed as to allow the smaller ones to slide into the other. At the far extremity of the anterior and larger tube there is an adjustable cylinder lens that can be made of any desired strength. This lens, which is a centimetre in diameter, is made in such a way that it can be rotated around a degree index which is engraved upon the border of the circumference of the barrel. This index register runs from zero to one hundred and eighty degrees. Just inside of this lens in the tube there is an accurately centered iris diaphragm. The diaphragm, which is perforated, is connected with a graduated screw head that is situated upon the outside of the barrel. The graduations upon the screw head are gauged in such a manner that each index movement represents an increase of one millimetre opening in the center of the diaphragm. More deeply situated in the tube there is a carefully ground biconvex lens of twenty dioptres strength. This lens represents the main focusing apparatus of the contrivance. Fastened to the anterior part of the underneath portion of the barrel there is a sliding arrangement of heavy wire, which, with a small hook at the posterior part of the barrel, makes either a firm base upon which the contrivance can stand or a means by which the apparatus may be suspended.

The wire base is so gauged that when it extends to its greatest length out from the anterior face of the barrel the distance measures about twelve millimetres.

The smaller tube has a double index running the greater part of its length upon its upper face. The indices, starting from zero, run sequentially backward to "6" along an "M" line and forward to the

*Read before the American Ophthalmological Society, at the third triennial meeting of the Congress of American Physicians and Surgeons, May 31, 1894, by C. A. Oliver, A.M., M.D.

same amount on an "H" line. To the back face of the tube there is an arrangement by which an adjustable flat disc can be screwed into position. It contains a colored representation of the normal fundus oculi engraved upon enameled paper.

This model, which has been constructed upon the principle involved in Queen's student's eye demonstrator, that was made upon the suggestions of Dr. William Thomson of this city, embraces more of the salient features of the human eye in the least possible compass than any other form of similar contrivance.

Starting with a focal distance of five centimetres, which is marked upon the smaller tube as zero, emmetropia is reached. By gradually withdrawing the smaller tube the exact equivalents of axial myopia are obtained, this being registered by the numbers upon the linear index engraved upon the tube. By slowly pushing the smaller tube into the larger one from the point of registry of emmetropia, increasing amounts of axial hypermetropia are obtained. If it be desired to study astigmatism, the cap containing the cylindrical lens can be adjusted to the face of the large tube, and any axis of least and greatest astigmatism of the strength of the lens employed in the cap * can be easily obtained by revolving the cap around the graduated circle upon the circumference of the larger tube. To this astigmatism, supposing it to be studied while the fundus level is placed at the emmetropia mark, any degree of ametropia up to the full extent of the instrument's registration can be added, remembering that in the minus series, or those that are designative of near-sightedness, the strength of the cylinder lens used must be subtracted from the amount of the degree of myopia that is registered.† Should desire be had to study the relative elevations and depressions of localized areas in the background of the eye, as, for example, suppositional swellings of the optic disc as found in papillitis, or supposed cupping of the nerve head, as is so often seen in glaucoma, the observer's gaze can be limited to the varying appearances of the optic disc when the tubes are approximated to one another and when they are separated to different degrees. Here the amount of correction that is necessary with the ophthalmoscope to produce proper definition of the optic disc, or, in fact, any other part of the organ that can be so studied when the smaller tube is slid backward and forward in

* In the ordinary model made for the writer a convex cylinder of one dioptre's strength has been used.

† Of course, it must be understood that upon account of the slight separation of the two lenses in the tube there must be a variation from the exact equivalent in the readings.

the larger one, can be employed to designate the degree of change of antero-posterior position of the area under consideration from its supposed normal plane.

In this study it should always be remembered that when the tubes are approximated the relative position of the disc, as compared with that when it is situated at the mark which is intended for emmetropia, is equivalent to the projection of an object forward into the chambers of the eye, as in intra-ocular swellings. Further, it must be understood that when it becomes necessary to separate the tubes, the abnormal position is equal to the recession of an object, as, for instance, in pathological cuppings of the optic nerve head.

In the ordinary model the appearance of the supposed normal eye ground is given. If desired, this picture can be used as the basis upon which any one, if an artist, can sketch and paint any variety of pathological change desired. The student is thus enabled at a moment's notice to have proper ophthalmoscopic representations under almost the same conditions as when they are studied from the living subject. The plan, therefore, if carefully tried, will give far better ideas of the true nature of the ophthalmoscopic appearances of intra-ocular changes than in any other form of graphic reproduction. In reality the technique becomes almost the same as when it is done with the patient, and the findings are rendered quite similar to those which have been sought to study. To offer additional difficulties in the work, and thus give much greater ability in afterwork, especially among old subjects, the pupillary opening can be diminished to extremely small areas, and the studies repeated under these circumstances.

Besides giving practice in the frequently repeated technique that is necessary to obtain any degree of expertness in the handling of the ophthalmoscope for the production of proper and adequate results in both of these plans, there remains a third and most important method of precision which can be practiced with this little model of an eye. This, which is the ordinary fundus-reflex test, can be employed by either having the artificial eye placed upon some object that will bring it upon a level with the supposed eye of the patient, or having it suspended from some point so as to bring it to a convenient height for observation.

Practically, in all these procedures the method is the same as would be pursued were the artificial eye a living organ.—*New York Med. Journal.*

The Clinic.

I. Here is an interesting case. This girl came here six months ago, having peculiar attacks epileptiform in character. She had one while under examination. This is one of my second class of cases of squint. When there is amblyopia we have the first class, and in the second class, relative hypermetropia.

II. This little boy was born with amblyopia of the left eye, there being almost no sight in the left eye, and this case would represent the first class. The vision of right eye is normal. The power of the internal rectus should be four times as strong as the external rectus. When he attempts to see there is no power to fix the eyes when the object is held close to him, the image is blurred, and there is no guiding sensation. Covering up the eye or using atropine and glasses would do no good at all. This belongs to the first class of squint, and should be operated on at once. I operated and cut the internal rectus with little effect. Four weeks ago, by a new method, I advanced or "took a tuck" in the external rectus. I passed the thread through near the insertion of the tendon, and then through the muscular fibres. His eye now is nearly straight. There is great improvement, but it will be necessary to do another operation and weaken the internal rectus of the other eye.

In the girl who had squint of the second class, there is hypermetropia, accommodation is weak, she cannot see twelve inches in front of the eye, and cannot control the ciliary muscle. There is an attempt to stimulate the centers of accommodation and the eyes converge to six inches for sufficient accommodation to see at twelve inches with the fixing eye. When glasses are put on the squint disappears. One eye turns in and does not focus any rays of light, either on the macula or elsewhere. There is squint and reduced vision, but not amblyopia. There is want of power from disuse, but when glasses are put on the vision comes back. The boy will never see any better, but the girl will. There is no convergence with the girl as long as she wears glasses. Some say they can restore vision to the amblyopic eye, but it is not so. The brain discards what it sees in the second class, as we do when using the ophthalmoscope, but in this class, if the unaffected eye is destroyed, vision will be rapidly restored in the other eye, as the retinal elements are normal and their functions dormant. In testing amblyopia you will find no material change in vision after your operation.

Although the girl had no squint after glasses were put on, she

still had the slight epileptiform attacks. I cut the internal rectus of the right eye completely through, as the guiding sensation is perfect. Hence if the eye is not bandaged, we need have no fear of the eye turning the other way. Yet she still has those peculiar feelings. On last Monday I did a complete tenotomy on the internal rectus of the other eye, and still there is no deviation of the optic axes and she has had no attacks since.

III. This girl had epileptiform convulsions, as many as twenty or thirty per day, which were reduced by the use of atropine to almost none. She has compound hypermetropic astigmatism. She wears glasses and still has attacks. When accommodation is paralyzed by atropine there are no spells. You see in these cases, 1st, squint with amblyopia, 2d, squint without amblyopia, and with relative hypermetropia, and 3d, reflex want of power in the ciliary muscle and in lateral movements of the eye. Study every case carefully by itself.

The first girl does not squint when she takes off her glasses, and may in time be able to go without them. In tenotomy I do not think it necessary to put in sutures, but cover the wound until the patient is home and then use simple cold water dressing. Don't tie up; if you do so you take away the guiding sensation.

In convergent strabismus with amblyopia, operate for cosmetic effect. In squint of the second class, do everything for six months, and then operate, if necessary, for useful vision and cosmetic effect. —*Dr. Valk in The Post-Graduate.*

* * *

Chronic Retro-Bulbar Neuritis.*

The true pathology of this affection was not well understood until the first demonstration in an autopsy by Samelsohn in 1882. Leber, Michel, and others had referred to it before, but had never demonstrated the fact by autopsy. It has been demonstrated that "the marginal fibers of the disc end in its immediate vicinity, and in general the central fibers go to the periphery of the retina, while the peripheral fibers of the disc supply the central part of the retina, the papillo-macular fibers entering the eye as a wedge-shaped cluster on the temporal side of the disc, occupying nearly its inner and lower quadrant." As the title of the

* Read before the Louisville Clinical Society, November 7, 1893.

paper implies, it is only the fibers of the optic nerve in front of the chiasm that are involved generally.

Causes. The principal cause is alcohol or tobacco alone or combined. Some authors say it is tobacco alone, the alcohol acting only as a depressant. Of 138 cases, 64 were from alcohol, 23 from tobacco, 45 from tobacco and alcohol combined, 3 from diabetes, 1 from lead, and 2 from sulphuret of carbon. Other causes, as cold, especially cold blasts on the face, chloral, stramonium, and syphilis, are given by Swanzy.

Symptoms. The failure of vision is so slow usually that the patient does not discover it until it is well advanced. Only this week a man came in with tobacco-alcohol amblyopia whose vision was but one half of perfect. The patient complains of seeing as if he was looking through smoke or a veil. The vision of the two eyes is usually about the same, which is a point in differentiating it from disease of central origin. In the beginning there is no trouble with the field of vision. Later on, however, there will be discovered a central negative scotoma for colors, especially green and red. This scotoma is usually oval in shape, with the long axis horizontal, the retina involved being that portion extending from the temporal edge of the disc to the outer edge of the macula. Later on the perception of white will diminish in this area, and if the disease progresses may be entirely lost. Vision is often reduced to almost nothing in this affection, but total blindness is exceedingly rare. Patients say they see better in a reduced light.

It is not the periodical drunkard who is liable to suffer from this trouble, but the sipper or steady drinker, more often the fellow who never gets drunk. This disease is more common in the male than the female, in the old than the young, for reasons easily understood. Some author has stated that it does not occur in persons under twenty years of age, yet I have a patient now only sixteen years old; cause, the abuse of tobacco and beer.

A peculiarity of the disease is that a person may be nearly blind from tobacco-alcohol amblyopia, who under treatment may recover vision, then return to his old habits, and exceed even the abuse formerly practiced, and yet have no relapse. The ophthalmoscopic symptoms, especially in the early stage of this disease, are usually negative. The optic disc may be a little hyperemic, or present what I used to call a brick-dust color and granular appearance. Later on the temporal half of the disc becomes quite pale.

A point in differential diagnosis I have seen made somewhere, just where I can not now recall, is that by the inhalation of a little amyl nitrite vision is much improved for a while. I tried this last week on a gentleman about sixty years of age whose vision was only $\frac{1}{2}$ of perfect, the result of alcohol and tobacco abuse, especially the latter. I told him to look at the test card, and passed under his nose a glass stopper with a drop or so of the amyl nitrite on it, and he immediately exclaimed with much joy that he could see as well as ever. He demonstrated the fact by reading $\frac{20}{15}$, or more than required in a test for perfect vision. How long this lasted I do not know, as I have not seen him since. Strychnia hypodermatically in a large dose may have the same effect.

The pathological changes as given by Samelsohn and others in the optic nerve consist in an interstitial neuritis at its axis, commencing outside of the chiasm, preferably this portion of the nerve, and leading to proliferation of connective tissue, and to secondary atrophy of a certain bundle of nerve fibers. The changes are analogous to those which take place in the liver and brain as the result of chronic alcoholism.

Treatment. The first indication is of course to correct the cause. Promises to do so are easily gotten and as easily broken. A majority of the cases, if not too far progressed, will recover with no other treatment than the correction of the cause. Again, others will need the leech, Turkish bath, and strychnia; the latter preferably hypodermatically. I usually order strychnia nitrate, gr. iv; aqua, ℥j. Each drop contains gr. $\frac{1}{120}$ of the strychnia. I commence at gtts. ij, and increase one drop per day until the physiological effect is reached, which may be anywhere from gtts. xv to gtts. xl. Pot. iod. is indicated also, or I often give zinc phosphide and strychnia in pill.— *W. Cheatham, M.D., in The Am. Pract'r and News.*

* * *

Eye Symptoms. The patient complaining of the eyes being easily fatigued may be the first symptom calling your attention to a general anemic condition. If complaint is made of only seeing half an object, look for beginning of paralysis, with a lesion of tumor of the brain.

In many cases of parametritis and pelvic cellulitis the eyes are easily fatigued, accompanied by orbital pain, and more or less sensitiveness to artificial light.

In spinal disease, the patient is apt to have diplopia, photophobia, muscæ volitantes and undue retention of after-images.

Loss of accommodation is often present in pathological irritation of the gental branch of the trigeminus, a spur on the nasal septum, intestinal irritation from worms, diseases of the stomach, liver or intestines.—*Toledo Med. and Surgical Reporter.*

* * *

Myopia. Dr. J. H. Thompson, *Kansas City Medical Journal*, says: Near-sightedness in young children, evidenced by holding objects close to the eyes, is no proof of myopia, nor is the acceptance of a minus glass a certainty by any means that that condition exists. Children naturally hold objects close up. They sometimes suffer from spasms of the ciliary muscle, and they are always pleased at the diminution in size, and the distinctness in detail, of distant objects when viewed through a moderately strong concave glass. Therefore in young children myopia can not be determined until the eye is thoroughly paralyzed by atropine, and then the normal tension of the accommodation must be allowed for. Thus, if an infant five years old has, under atropine, an emmetropic refraction, it is very probable that it is myopic.

For the purposes we now use our eyes, myopia is somewhat of an advantage, and it may well be considered an evidence of progressive evolution. Nature, in her endeavor to accommodate herself to altered conditions, does not leave the even tenor of her way without protest. We find, during the progress of change passing through many years and generations, periods of disorder, when the progress of development is for the time being arrested. We break off old habits, perhaps good, and take on new, perhaps better, reluctantly. We acquire myopia and give up presbyopia, an advantageous step, but often do so at the expense of healthy eyes. We may, for these reasons, find two kinds of myopia, benign and malignant; the first, a natural condition, and the second the result of intraocular disease, often hereditary. The simple variety does not as a rule show itself before the twelfth year, the other, malignant and rapidly progressive, will be discovered at a very early date. This is a very serious condition, requiring the most careful treatment and complete rest. So if you find a little boy, or child attending school, wearing men's glasses, you may feel sure some one has erred. The blame is nearly always with the optician; this individual does not hesitate to fit concave glasses, for it is easy to do but difficult to regulate. Malignant myopia is a very dangerous disease, so far as sight is concerned, and should only be managed by a proficient ophthalmic surgeon.

THE REFRACTIONIST.

The Exponent of the Refraction World.

VOL. I DECEMBER, 1894. No. 9

SHALL LOW GRADES OF AMETROPIA BE CORRECTED?—A REVIEW OF ONE THOUSAND REFRACTION RECORDS.

BY MAURICE F. PILGRIM, M.D., CARBONDALE, PA.

NO question engaging the attention of Opthalmologists in recent years (with the possible exception of the proper treatment of myopia) has called forth such diversity of opinion as that pertaining to the utility of weak correcting lenses. Are they valuable or valueless? Opthalmic literature has been enriched by contributions from various sources touching this question, which is a vital one, but notwithstanding all that has been written about it, the subject is still far from *sub judice.*

Being persuaded by experience that it is very likely to be one of the first and most troublesome questions which will confront the young Refractionist at the very threshold of his career, I have deemed it expedient to put upon record for his consideration, the results obtained in a group of consecutive cases of refraction, with the conclusions that appear to be clearly deducible therefrom.

I write in no controversial spirit, nor from a desire to be pugnaciously dogmatic. I hope I esteem truth as highly as theory, and trust to compliment both in what I have to present. Following the discussions of this subject in the various journals during the last few years, too much personal bias or individual prejudice seems apparent. Much of the value of individual opinion is oftentimes lost by the caustic manner in which it is rendered. The discussion, at times, has seemed to partake too much of the personal bias of the writers; whereas convictions, born of experience, ought to be the controlling motive, and is the desideratum sought. The dogmatic

manner in which assertions *pro* and *con* have been tossed to and fro at the heads of opponents is better calculated to bewilder and dishearten than to assist the young Refractionist, whose experience has not been sufficiently extensive to enable him to rely on his own inherent resources. Nor is this said in a spirit of cavil. Discussion of all mooted questions should be encouraged, not condemned. That there is a disposition to do this, I regard as one of the most promising auguries in this special and progressive branch of medicine. But discussion should have for its central object helpfulness. This it cannot have unless one holds his opinions as a sacred hostage to truth, willing to maintain or surrender them at its behest, indifferent as to whether the conclusions coincide or not with previously entertained propositions.

Of what possible value is it to the profession to learn that Dr. A. or B. *believes* it a mild manifestation of lunacy to prescribe a 0.25 D. cylinder with the expectation of its availing anything in the relief of headache, or any of the reflex irritations due to ocular origin? Nor will the young Ophthalmologist be greatly benefited to learn that Dr. C. or D. *believes* that chorea, epilepsy, gastritis, myalgia, neurasthenia, spinal irritation, ovarianalgia, etc., etc., *may* be radically and permanently cured by wearing weak cylinders. One is pessimistic, and lacks enthusiasm as to the possibilities of his art; the other has permitted his amiable optimism to carry him far beyond the bounds of physiological reason. Neither ought, of course, to claim to be scientific, because neither is predicted primarily upon the basis of experience free from personal bias. Assertions are advanced because their authors either wish to or do believe them, and too often the results of experience are "culled," as it were, and only those calculated to bolster up a given faith are stated, while those pointing legitimately to another conclusion are ruthlessly ignored. Such conclusions come into existence discredited in advance because known to have been predetermined.

Desiring above all else to know precisely what experience had to offer relative to the utility or non-utility of weak lenses, I have recently carefully reviewed the records of 1000 consecutive cases of refraction. The results I am about to state below. These records, it should be observed, formed a part of the daily office routine into which, manifestly, no bias could have found place if it existed.

The result of the examination of my records in 1000 consecutive refraction cases may be summarized thus:

I. Seventy-eight (78) per cent of the 1000 cases refracted accepted glasses not over 1.00 D. (Incidentally, I might add that the word "glasses" is meant to include *sphero*-cylinders as well as cylinders, and that reference to the strength of the lenses not exceeding 1.00 D. refers to both the cylinders and the spheres where they were prescribed in combination.)

II. In every case embraced in the 78 per cent there was present some expression of ocular disturbance, either primary or reflex, due to eye-strain. This statement is meant to include asthenopic symptoms—headache, pain, ocular fatigue, muscular insufficiency, and the like, as well as external disturbances. Indeed, it is fairly inferable that it was only because of some expression of physical discomfort in, about, or referable to the eye, that this 78 per cent of cases ever found their way into the consulting room. Patients do not usually seek the advice of an Oculist unless they have a tolerably well defined impression, inspired by physical discomfort, that there is something wrong with them.

III. In nearly every one of these cases, astigmatism of a low grade was discovered, usually complex, often simple, rarely mixed.

I have been able to follow up and obtain the subsequent histories of these cases, thus enabling me to preserve complete records as to the result in all but 10 per cent of them.

This is the record of results: Eighty-one per cent (of the 78 per cent of cases) reported *entire relief* from the annoyance that brought them to the consulting room; six per cent were *appreciably* but not entirely relieved; three per cent reported "no relief" whatever; while, as stated above, ten per cent failed to make subsequent report.

With respect to the 10 per cent who failed to report, it need only be said that an Oculist is much more likely to receive a subsequent visit from patients for whom he has unsuccessfully prescribed than from those whom he has benefited. The world is ever more eager to condemn than to praise. I have sometimes thought this was more strongly emphasized in an Oculist's career than in any other department of life, perhaps. Therefore the failure of the 10 per cent to report is by no means *prima facie* evidence of their having failed to receive benefit. Certainly it would be as unjustifiable to add them to the three per cent who utterly failed of benefit, as to credit them to the 81 per cent of "entire reliefs."

I pause at this point to anticipate the rejoinder of the caviler:

"Why did you deem it necessary to prescribe glasses in those cases of low errors, inasmuch as the ophthalmoscope is not capable, in the most expert hands, of measuring an ametropia of 0.50 D.?"

My answer must necessarily be sufficiently digressive to enable me to state my methods of refraction in these cases. Both subjective and objective tests were employed, and disclosed an error of refraction approximating the strength of the lens prescribed. I am not unaware of the contention of men eminent in ophthalmology, that emmetropia is rare—only to be found in savages,—that the normal eye is hypertropic, even astigmatic. Without affirming or contradicting that claim, I deny that the normal eye is *asthenopic*, or that eye-strain, as it is expressed in red and inflamed lids, styes, meibomian cysts, tarsal tumors, etc., is the common physiological heritage of the human race. It may be that ametropia is the normal condition of the human eye, but, if so, one must be prepared to indict the Creator with carelessness in the construction of his handiwork!

In every case, without a single exception, my refraction was made under a mydriatic, usually homatropine hydrobromate. Where that failed to *completely suspend* ciliary activity, atropine sulphate was instilled until full mydriasis was attained. A mydriatic was never omitted, and I think it a fair assumption that, without complete mydriasis, not more than half of these low errors could have been determined, measured, and properly corrected. It is in just this class of cases—low errors, especially when astigmatic—that the mydriatic becomes an arm of precision of priceless value to the Oculist.

Next in importance, rivaling but not surpassing the mydriatic in value, is Skiascopy. My cases were all subjected to the "Shadow Test," and final disposition largely determined by its findings. Skiascopy is destined, in my belief, to be one of the "classics" in future refraction work. I am not unmindful of the long catalogue of inaccuracies alleged against this method of determining ametropia, but I am equally mindful of the sources from which they emanate. The successful use of Retinoscopy, alike with Ophthalmoscopy, requires skill and dexterity that are only attained by patient and persistent practice directed along proper lines. A somewhat prolonged use of Skiascopy only serves the more firmly to intrench me in the belief that it is the Oculist's sure support in time of doubt. Invoking its aid, he need not err even though his patient be the veritable "wayfaring" fool alluded to in Holy Writ. I know of no other method, objective or subjective, that so quickly and effectually frees

the Refractionist from the thralldom of a hesitating, stupid, or irascible patient. Using the Skiascope, it becomes a matter of indifference for the main purpose in view, whether the patient is intelligent or not; whether it is a child, or one of that all-too-numerous class who, though an adult, comprehends and acts like a child. All that is required is a patient with sufficient gumption to sit still, and a Refractionist possessing the sense and skill requisite to do his work properly.

After the above digression, it will not be amiss to recapitulate my findings:

In 1000 cases 78 per cent revealed an ametropia not exceeding 1.00 D.; of the 78 per cent *all* complained of some phase of discomfort, either directly or indirectly referable to the eye; considerably more than three-fourths of these cases were astigmatic, usually hyperopic; 81 per cent were satisfactorily relieved of the trouble complained of, and, in most instances, *by glasses alone;* six per cent derived *partial* but not complete relief; 10 per cent were lost sight of because of their failure to report; leaving but three per cent of failure, total and abject.

These facts are submitted as furnishing abundant justification for the writer's contention that weak correcting lenses *do correct*, and correcting, *cure*.

At another time and in another paper, I hope to be able to account for the result detailed above, upon purely physiological and theoretical grounds. My present purpose is accomplished by putting on record the facts, without endeavoring to present any theories in justification or explanation thereof.

INSPECTION OF THE EYES OF SCHOOL CHILDREN.

By F. F. WHITTIER, A.M., M.D.

PREVENTION of disease is the keystone of medical knowledge. Vaccination has robbed small pox of much of its fatality. The study of tuberculosis has brought to light alarming facts. These facts if heeded will lessen in a great measure the death rate from this most destructive disease. Antitoxine is still in its infancy and we trust it will pass to a vigorous manhood. Not only the profession but the laity are interested in these practical developments. Each generation profits by the preceding one. Daily school inspection for contagious diseases is a modern idea. No more practical use of the profession could be devised. To get the best results the physician should have the hearty co-operation of parent, teacher and pupil. A strict surveillance with the practical teachings carried with it will decrease the ravages of these diseases. Following this we should have the annual inspection of the eyes of school children. Though the results might not be the saving of life it certainly would save much suffering and be of benefit in various ways. The need should be as obvious to every oculist as the obstacles to be overcome are evident. Within the present generation great advancement has been made in the knowledge of the eye. Statistics have also been gathered which give us a working basis. The freedom from errors of refraction in savage people and tribes is a matter of history. The presence of such errors in our own midst is a matter of daily comment. They are myopia (near sight), hyperopia (far sight), astigmatism (difference of curvature of different meridians of the eye), and heterophoria (muscular insufficiencies). It matters not particularly for present purposes which error predominates, although myopia seems to have gained that position. Investigations in different countries give the same results and proves to us that the injury is done during the period of school life, that is from six to twenty years of age, the most susceptible period being from eight to sixteen, when the body as a whole is most rapidly developing.

It is the experience of every oculist that myopia that originates after a person is twenty years old is extremely rare. It is caused

probably by over-application hastened by a tendency from heredity. It has been said that man is four-fifths heredity and the other fifth environment. Some would reverse this. No one cause will account for all cases. The theoretical way to obviate these difficulties would seem to be to rearrange our school work so that less should come before and during the formative period and more afterwards; or, what would be preferable, the period of study should be extended. This would be delaying the time for leaving school which, from an experience of ten years as teacher, we know would be rather impracticable, as many are retained in school work at present a sufficient time with difficulty. Here we come directly in contact with the parents, who are for the most part anxious that their children should be rushed along as far as possible. Some do this from pride, others from necessity. The annual inspection of our schools by competent oculists would doubtless bring better results than any other method of procedure, not only on account of the immediate effects produced on pupils but the educational effect on the parents and others concerned. Not only should the eyes of the pupils receive attention in reference to refraction and color blindness, but incidentally suggestions should be made in reference to the system of lighting, type, position and kindred topics. The teachers also should be instructed in the proper arrangement of the pupils so that those with deficient sight should be placed where work on the board could be easily seen, or might be directed to some line of school work more in harmony with their condition. Different lists of occupations should be provided suitable for persons having certain vision.

A generation of this work would revolutionize the statistics of the present age, and do away with many of the false ideas in reference to wearing glasses and the way to procure them. The larger part of our school children, when their eyes reach that condition where something must be done, owing to the ignorance of the parents visit the nearest jewelry store, which generally contains a mongrel optician; or, worse still, fall an easy prey to some traveling professor (?) who increases the trouble. One of our large optical houses, which professes to fill 300 prescriptions a day and does refracting on the sly, boasts that eighty-five per cent of its work comes from this class of people. Is it a wonder that the eyes of our children are deteriorating? Any oculist who patronizes such a house is simply encouraging robbery. The old ruts are easy to run in. The advancement in

refraction work during the past twenty-five years has brought us to the verge of a change in this line of work. The ignorance of the pretender must give way to the skill of the physician. There are ten times as many oculists in the country to-day as there were a decade ago. It is the old story of the demand creates the supply. The remark of one of the leading oculists of this state less than ten years ago, on presentation of letters from two leading oculists of New York, recommending a physician for a position in an institution in Boston, was, "A few of us have the eye work of New England in our grasp and we dislike to let it go." The barriers of this narrow-mindedness are fast giving way, thanks to the post-graduate schools and clinics of the country, and the knowledge thus diffused to the profession concerning refraction is bound to bring good results.

We cannot too soon impress on the minds of the parents, teachers and pupils the importance of the proper care of the senses of human nature. A case of not unusual occurrence is of a child, censured for its apparent stupidity, who passes from teacher to teacher till some one is observant enough to surmise some defect of sight or hearing, and on succeeding in inducing the parent to visit a physician the error is found and corrected, and the appearance and intelligence of the child is astonishingly awakened. It remains with our school boards and superintendents to inaugurate this work. As soon as they appreciate the need of this advance sufficient competent oculists can be found to aid them in their endeavors to check some injuries resulting from our modern civilization.

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AN OPTICIAN'S CASE OF ANISOMETROPIA.

BY C. R. DUFOUR, Phar. D., M. D., Washington, D. C.

Physician in charge of Eye Department of Eastern Dispensary, assistant in Eye and Ear Department Emergency Hospital, and Instructor in Ophthalmology and Otology in Georgetown Medical College.

MRS. H., aged 53 years, was brought to my office by her friend, to see if some relief could be given her eyes. Mrs. H. stated that "she had consulted an optician who tested her eyes and fitted a pair of glasses." She complained of being unable to walk while having the glasses on, and of great pain whenever she wore them. Upon examining the glasses I found them to be R. + 1.50 D. cyl., axis 135; L. — 1 D. cyl., axis 180. Vision with these was R. $\frac{15}{30}$ +, L. $\frac{15}{30}$. The ophthalmometer readings were: R. 1.65, $25\frac{1}{2}$, 75 X. $1\frac{1}{2}$; L. 20, $25\frac{1}{2}$, 110 X. 1. There was no muscular trouble. I could not by any method improve the vision in left eye. The right could be improved by using a + 1 D. cyl., axis 60, V.= $\frac{15}{15}$. Notwithstanding her age I decided to use a mydriatic in her eyes. I therefore ordered homatropine solution gr. i. to ʒi., two drops to be dropped into each eye every ten minutes for one hour. Upon examining the eyes after the use of the mydriatic, I found R. E. V. = $\frac{15}{40}$, with + 1 D. cyl., axis 60 = $\frac{15}{15}$; L. E. V. = $\frac{15}{40}$, with + .50 D. cyl., axis 115 = $\frac{15}{20}$. A subsequent examination verified the previous one. This correction I ordered for her, and it gave the relief which she sought.

I report this case, which was of interest to me from the fact that there seemed to be simple myopic astigmatism in the left eye, which proved to be erroneous upon the use of a mydriatic, a procedure which is seldom resorted to in determining the refraction error of persons the age of this one.

1016 I STREET.

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Address all communications to the Editor.

Opticians. What is an optician? We always supposed it was a person who ground lenses, prepared frames, and sold the same. In recent years there has sprung up a class of people consisting of jewelers, watchmakers, and jacks-of-all-trades, who try to claim for themselves this dignified title and deceive people not only in reference to their knowledge of a straight optician business, but even go so far as to palm off on the public their pretended knowledge of things that pertain to the realm of legitimate ophthalmology. An Association of Opticians (?) has been formed within the past year in Boston. Now, of straight opticians there are not enough in the city to form a triangle. The organization formed, the next thing in line was to invite the oculists to address them. What honor for the profession! Soon we shall have optical colleges at every crossroads, and some one in the profession will be found anxious to cater to this class of aspirants. Refraction work will never take the place in medicine that it deserves as long as physicians identify themselves with a heterogeneous mass of pseudo-opticians. It is refreshing to hear that one of the last lecturers before this august body had the courage of his convictions, and told them a few things that were undreamed of in their philosophy, or in the words of one of the hearers, "he fairly wiped the floor with us." It remains with physicians in every way possible to offset this growing tendency to non-medical refraction work, and to instruct the laity in reference to the danger of the same.

* * *

Patent Medicines. The Norfolk Medical Society was the guest of one of its members, at the University Club at the last monthly meeting, when a paper was presented on Medical Advertisements. We hoped some improvement would be suggested in the advertisements sandwiched

through our medical journals. Instead of this the religious and daily papers with the harmful preparations advertised were severely criticized. We can hardly see why we should wreak our vengeance on sarsaparillas, kidney cures, and so forth, and pass by with indirect words of recommendation an emulsion that is just as rank in its advertisements as anything else of its class.

The doctors may blame themselves for the present state of affairs in our newspapers and journals. It has grown out of prescription writing and winking at medical journals that cater to the public and the almighty dollar.

If the doctor will examine the three (in his opinion) leading medical journals of the country, he will find the origin of most of the nuisance. We are with the doctor heartily in this matter, but if we wish to stay the spread of the contagion would it not be well to disinfect the source.

* * *

Selections.

Professional Advertising.

Specialization of work becomes possible only as a sufficiently large number of persons can be brought into communication with the specialist. When the older parts of the country were but sparsely settled, and still in the more thinly inhabited portions, it was or is impossible, for the member of the community who serves as its doctor, to get his living by that alone. He must combine with his medical or surgical work that of farmer or barber or storekeeper.

As, however, the country becomes more densely populated, one man may be a doctor only, and leave the other employments to other men. When the population has become so dense and the means of communication so good that two can be wholly employed and supported in the same territory, one may become physician exclusively and the other a surgeon. And this process continues until in the large town or city that supports many members of the profession we may have oculists, gynecologists, orthopedists and so on through the list.

The increase of specialism, however, can only go on as the specialist is able to draw on a larger number of people for his support,

and to do this he must in some way acquaint that larger number with himself and his work. Extending this acquaintance is the legitimate function of advertising. Specialism and advertising of some sort necessarily go together. This connection is neither recent, nor local, nor temporary. When the doctor gave up his farming or storekeeping, he put out a sign and got a degree setting forth what sort of work he expected to do, and assumed a professional demeanor, all calculated to extend in the community the knowledge of what service he was prepared to render. And with larger numbers of people to be reached, and new means at hand by which to inform them of his existence, no "conservatism" on the part of those who fail to recognize the continuous forward flow of events will prevent the adoption of new methods of professional advertising.

By the later specialists teaching and hospital positions, have been eagerly sought for their supposed advertising value, and the article in the medical journal has become a part of the routine task of the aspirant in this direction, until the profession and the community are both suffering from the multiplicity of medical schools and hospitals, and legitimate medical literature is drowned in the torrent of medical writing. And still the professors and holders of official positions are certifying nostrums and "mineral waters," being interviewed by the ubiquitous reporter, and in every way struggling to have their names floated to a still larger circle of possible patients.

There can be no question but that specialization, in so far as it is normal, is progress. That community is better served, more cheaply and satisfactorily served, by legitimate specialists than by jacks-of-all-trades. Specialism is bound to extend, and for the evils its attempts at advertising now inflict, no more efficient remedy will be found than proper and efficient means of accomplishing this necessary function. When Dr. Smith can otherwise let the community know that he is prepared and desires to practice ophthalmic surgery, his desire for a professorship or a hospital service, irrespective of his aptitude for teaching or his interest in studying hospital cases, will be greatly moderated; the true teacher and clinical student will have a correspondingly better chance, and mushroom medical schools and new hospitals will be less of a burden in the land.

Of course the best, the most legitimate advertising comes through one's fellow members of the profession. This must rank above that which comes by the mouths of patients. For usually the doctor with a ready tongue and an abounding confidence in his own abili-

ties will secure the support of the loud and persistent talkers of a community, rather than the modest man of higher skill. The judgment of one's professional fellows if not perfect must at least rank higher than any other generally attainable, so that this channel of advertisement is least liable to be abused, and everything that aids to consolidate and organize the profession is to be favored on this account.

But other channels, too, must be provided, and one to be considered is the proper announcement, by sign and newspaper card, of the branch of practice followed. A difficulty in the matter has been to so word the announcement as to clearly convey the meaning intended, without making a claim of special and peculiar skill in the treatment of the class of diseases indicated. The American Medical Association some years ago decided that it was proper to publicly announce that one's practice was limited to diseases of the eye, diseases of the skin, etc. But to append the title oculist or dermatologist, was to make a claim of special skill, and, therefore, forbidden.

Recently the Schuylkill County Medical Society discussed this subject and adopted by a vote of 19 to 8, the following form as proper:

"Dr. W—— X——, (address), Physician, Surgeon and Obstetrician (or Oculist, Aurist, etc.), (or restricts his practice to Diseases of Children, etc.). Office hours ——."

It is quite possible that, at the time the American Medical Association took the action that it did, the incomplete development of the specialties, so-called, and the way in which the terms were commonly employed, gave more force to the objection to such terms as oculist and aurist than now holds. Unless the meanings usually attached to the two forms of expression in the community be still radically different, there is much to be said in favor of the briefer form. It is never good English to use a phrase or a sentence where a single word will make the word equally clear; and the spirit of ethics cannot be legislated into doctors by enforcing a peculiar phraseology, the peculiarities of which neither they nor those whom they address appreciate. The Schuylkill County doctors have clearly gone against precedent. But ours is not the profession in which to go against precedent is held to be the worst of offences.—*Editorial in The Philadelphia Polyclinic.*

What the General Practitioner should know about Diseases of the Eye.

That there is a lack of knowledge in the profession regarding the elementary principles of ophthalmology will hardly be denied by any one who is at all familiar with the facts. Our crowded college courses and the feeling among students that they are not required in actual practice to know anything of the eye, owing to the multiplication of specialists, are largely responsible for this. Again, the subject is so extensive that it is difficult to decide where to leave off the study; and, instead of mastering a few general principles with the more important facts, too often the matter is skimmed over, and a superficial knowledge of much is obtained instead of a thorough acquaintance with what is most necessary. It will be the object of this paper to define the minimum amount of knowledge of this subject which one should have before entering upon the practice of medicine. If he understands these things well he will find it much better for his reputation, his pocket-book, and his patient; for if he makes a mistake elsewhere the kindly earth will cover it up, but here an error will be a walking advertisement to his want of skill or lack of knowledge.

In the first place, it is not to be expected that every doctor should become a specialist, or in any sense competent to deal with all eye effections, but he should know enough to know his ignorance. Secondly, it is not necessary for him to understand how to fit glasses, but he should know the main indications for the use of spectacles; for example, presbyopia, diminished vision, asthenopia, headache, functional nervous disorders. In the third place, he should not attempt to use the ophthalmoscope for several reasons: First, it will not pay. He will not realize enough out of the cases to pay the cost of a good instrument. Then there is the cost and time of learning. It would be cheaper for him to pay the fee out of his own pocket to a competent specialist. He could not keep in practice for this work. Most books on diseases of the eye have a chapter on the ophthalmoscope, which always seemed to me worse than useless.

We can divide the cases under consideration into four classes: first, those with impaired vision; second, those complaining of pain referred to the eye; third, the inflammatory cases; fourth, the miscellaneous cases. Your patrons have a right to demand that you know something of these, and not depend entirely on the oculist. You will be compelled to give advice in all these cases, and you

should know how to advise and when it is necessary to call in a specialist. You should know that every case of impaired vision and any clear cornea should have the benefit of an expert examination, provided that there is any perception of light. The doctor should be able to test for perception of light. He should know that where there is no perception of light, or where the cornea is opaque, that it is not worth while to subject your patron to an expense for an examination. He should know, where spectacles are supposed to be required, that the oculist, and not the traveling charlatan nor the optician, is the proper person to whom these cases should be referred. He should be able to diagnose between glaucoma and cataract as a cause for poor vision, and not advise the former to wait until it gets ripe, with the result that a specialist is consulted when it is too late to preserve any vision.

In our second class of cases, in which pain is the prominent symptom, glaucoma is at once suggested. With the diagnosis of this disease every practitioner should be familiar. It does not require any skill to diagnose increased tension (hardness) of the eyeball in a well-marked case, and the other points of the diagnosis should be well understood. Pain in the eye without inflammatory symptoms is more often glaucoma than neuralgia. In some cases of glaucoma the reflex symptoms have predominated so that cases have been treated for biliousness. You should know enough to prescribe myotics until an operation can be performed.

The general practitioner will be most often consulted in reference to our third class of cases, the inflammations. In all inflammations of the eye atropine is indicated, with the exception of the inflammations of the conjunctiva. Even here it will, as a rule, do no harm, so that in a case of doubt it would be best to use it, as the neglect of this agent may result disastrously; but the doctor should know that it is to be used with caution in all cases over forty years, and that it is positively contra-indicated in cases where there is any tendency to glaucoma. While many of the inflammations of the eye tend to spontaneous cure, and others would get well if treated on the above general principles, still it would be better to consult a specialist early, and carry out a line of treatment laid down by him, than to send him the case after all other resources are exhausted. The doctor shonld know the indications and the contra-indications of atropine and also of eserine. In some cases it is difficult to diagnose between glaucoma and serous iritis. If it were iritis and eserine or pilocar-

pine used to contract the pupil the case would be made worse. If it were glaucoma and atropine or other mydriatic used the result would be disastrous.

Under the fourth head are included all cases of functional nervous disorders, reflex and otherwise, which may be benefited by wearing glasses, or by some treatment, operative or otherwise, of the eyes. This includes cases of asthenopia, headache, chorea, epilepsy, and all obscure nervous troubles. It is sufficient for you to remember that many of these cases have been relieved and some cured by treating their eyes. Injuries of the eyeball should, as a rule, be referred to a specialist at an early date, and especially if there is a suspicion of a foreign body, on account of the danger of sympathetic ophthalmia.

An endeavor has here been made to briefly outline the minimum knowledge of this branch which a general practitioner should have. More might be useful; for instance, the size and mobility of the pupil will often aid in diagnosing cerebral affections or general diseases. What has been given seems to be indispensable to any one who wants to practice medicine conscientiously.—*Frank T. Smith, A.M., M.D., in The American Practitioner and News.*

* * *

Cataract. Cataract is an opacity of the lens, its capsule, or both. The different varieties of cataract have been classified, as follows:

1. With reference to the age of the patient, as senile, juvenile and congenital.

2. With reference to their consistency, as hard and soft.

3. With reference to their cause, as traumatic, idiopathic and diabetic.

4. With reference to the stage of development, as incipient, mature and hypermature.

5. With reference to the extent, as complete and partial, this latter class being subdivided with reference to tho location of the opacity, as central, zonular, anterior polar, posterior polar and capsular.

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SHALL LOW GRADES OF AMETROPIA BE CORRECTED?

BY MAURICE F. PILGRIM, A.B., M.D., CARBONDALE, PA.

(Continued from No. 9, Vol. 1.)

In a previous paper I endeavored to summarize the results of 1000 cases of refraction, as a contribution to the discussion of the mooted question as to the value of weak correcting lenses. The results, as therein stated, left no doubt in my mind as to the proper conclusion to be deduced therefrom.

Personal experience leaves me no room to question the utility of correcting even very low grades of ametropia *when it begins to cause trouble.* Let the latter clause be emphasized. As a matter of fact, oculists are not likely to see either high or low degrees of optical error unless the patient is troubled. However amiable we may be as a class, people generally choose to meet us elsewhere than in our consulting rooms. The prescribing of weak lenses for the relief of ametropia and its effects, is rational, susceptible of explanation and justifiable on purely theoretical grounds. Erroneous refraction of low degree is much more likely to occasion nervous disturbances such as frontal, orbital, or occipital headache, conjunctivitis, corneal ulcers and irritation, blepharitis marginialis and ciliaris, meibomian and tarsal cysts and tumors—in short, any or all of the numerous external inflammations around, about or in the eye, than are errors of high degree. Persons having a high degree of error quickly recognize their visual limitations and make little or no effort to see beyond a given point. Finding that objects at infinity

are either not seen at all, or, if so, imperfectly, no effort is made to project vision beyond the point of distinctness of outline. Highly imperfect eyes very readily (and unconsciously to their unfortunate possessors) acquire the habit of visual self-limitation. This is particularly true in tolerably high degrees of myopia and, to a lesser extent, also in hypermetropia. Not so, however, if astigmatism, (particularly if of low degree) happens to intervene as an element, as it does in by far the larger proportion of cases seen by an oculist. The reason why so many cases of astigmatism appear upon our case-books is doubtless because they have confounded the ubiquitous spectacle vender and "Cheap Johns" who advertise to "*examine eyes free and use no (?) drops.*" Failing to obtain the desired relief from sphericals alone or a cylinder clumsily adjusted by these "peddlers" (*"Professors"*) and *alleged* opticians, the sufferers find their way (oftentimes unwillingly) in due time to our consulting rooms. The average so-called "Graduated Optician" of two or three weeks incubation, and the peripatetic spectacle-vender dislike dealing with astigmatism as cordially as his satanic majesty is reputed to have abhorred "holy water." Indeed, it is doubtful whether they are able to recognize it at all. Again and again have I found cases where a low astigmatic error had been gravely pronounced "cataract," or some equally serious ocular trouble, simply because the mongrel optical pretender was unable, on account of active ciliary action and pre-existing eye-strain, to get the patient to accept any of the lenses he essayed to sell. If they can only find a lens that the poor dupe of a patient can contrive to see through with any degree of distinctness, he is, in their opinion, "fitted;" otherwise his eyes are beyond the power of skill to help! Nor do I believe that the skillful and experienced oculist would fare much better in these low grades of error were he to discard a mydriatic or the retnoscope and rely upon subjective methods alone. Experience persuades me that it is almost always in conjunction with low rather than high degrees of error that the external evidences of eye-strain are seen. It is extremely rare to find blepharitis and the various phases of conjunctivitis in connection with errors of high degree, and, obviously, for the reasons above indicated. But where the visual image is slightly imperfect, so as to still permit of ciliary energy acting vicariously, as it were, and compelling a perfect focus with an imperfect cornea or lens, we may look for and usually find the direst ocular disaster. Here we have an almost continuous dis-

sipation of nerve force poured out in the successful attempt (for a time) *to force* a perfect focus. These are the patients composing the largest class who come to our offices complaining of ocular fatigue and distress, but who still complacently assure us that "there is nothing the matter with my (their) sight." Perhaps "Prof. Jumping Jack," or a "Graduated Optician," had "tested" their eyes without using, of course, the dreadful "drops," and found them "all right" because unable to sell them a glass with which clear vision was *at once* possible. The ciliary muscle being in a state of agitated overaction, the patient, as is usual in latent hyperopia and low grades of astigmatism, rejects all lenses. This ends the "Jingo" business, and the "Professor," "Graduated Optician" or jeweler loses a sale of his wares after giving his valuable (?) services, for are not "eyes tested free?" Being thus assured of the perfection of his sight, the patient comes to us prepared to rebel instanter if we manifest the temerity to challenge the accuracy of the pre-determined diagnosis or the information vouchsafed. Frequently the patient himself has determined his emmetropia (?) without other assistance, and generously confides that fact so as to facilitate our work and economize our time. It is a useless expenditure of time to comment upon the utter valuelessness of all such *a priori* statements. If the oculist proceeds according to my undeviating custom, his ear will be deaf to these gratuitous statements, and he will promptly instil a mydriatic and proceed to determine for himself. In other words, *he will be inquired of, not informed;* he, and not the patient or the patient's friends, will be the oculist.

The clinical history of an average case of moderate error is about this: Given the error; duration variable; presently there ensues as a legitimate sequence of unphysiological expenditure of nerve force, ocular fatigue and any or all of the long train of disturbances comprehended under the somewhat expansive and indefinite term of "asthenopia." In conjunction therewith or following closely upon this condition, the manifold as well as diversified external expression of eye-strain already referred to will be found. After suffering for a length of time varying with the peculiar temperament and physical and nervous make-up of the individual, the patient is prepared to consult an ophthalmologist. It may be for relief from the *effects* of eye-strain such as blepharitis, granular conjunctivitis, etc., that the oculist's assistance is sought, or because the eyes tire easily and pain when used, or anything or everything, ordinarily, *except de-*

fective focusing powers. Rarely does a patient suspect *that* as the trouble. Am I to be seriously told that because a refraction error is found that is corrected with 0.25 D. or 0.37 D. cylinder, the patient suffering with almost constant occipital or frontal headache, lids inflamed and smarting, eyes tiring under the minimum of use, that this correction must be withheld because there is no efficacy in weak cylinders—that they are merely so much placebo? Must the oculist content himself with unsuccessfully treating—for it generally amounts to that without the aid of proper correction—by local agents alone these external declarations of internal ocular strain? Shall he, merely because the error is of low degree, ignore it and look elsewhere for the cause and cure of the aching head and eyes? If an affirmative answer is returned to these queries, my rejoinder must be that of the 78 per cent of the cases quoted in my previous paper, fully 50 per cent were relieved of all ocular and head discomfort by *cylinders* alone, or sphero-cylinders *not above 0.65 D.*, and *81 per cent by lenses not exceeding 1.00 D.* The number of cases, it will be conceded, is much too great to be accounted for on the plea of coincidents.

Neither time nor space will permit, were it otherwise desirable, of recital in detail of the various special features in all these cases. A summary of three typical cases, however, may, in this connection, be appropriately and profitably submitted. In doing so it should be remarked, however, that these three cases have been selected only because they are typical. They are by no means exceptional or specially remarkable. They are meant to be illustrative merely, for results similar in character, differing only in degree, attended the correction of low errors in all the cases comprising the 81 per cent to which reference has previously been made.

Case No. 1, was a lad 14 years of age, who had been industriously drugged for years in an unsuccessful effort to relieve a persistently disordered digestion coupled with an equally constant headache. Discovering an error of refraction, it was corrected thus: O. D. + 0.25 cy. axis 90°; O. S. + 0.37 cy. axis 90°.

This correction was prescribed not to relieve the gastric trouble, but the discomfort in his eyes which, after years of reflex peripheral disturbance, had only then declared inself at its centre of origin. My record, made seven months after giving the lad the above *weak* optical correction, reads: "No indigestion in over 6 months; no headache, eye-fatigue or eye-pain in over 5 months; has gained 27

lbs. of flesh, and is in every assential respect physically re-created; in lieu of persistent drugging, as heretofore, has taken but one dose of medicine of any kind since the refraction seven months ago."

Case No. 2, was a young lady 22 years of age, who gave a history of frontal headache more or less constant for 12 years. It was only of recent date that she had felt any pain in her eyes. She wore a habitual frown which deepened into a painful brow-contraction whenever attempting to focus objects near or far. Within the three months immediately preceding her visit to me, she stated that she had been frequently annoyed by diplopia, but this was not constant. It was only, however, when her general health was below par, or when using her eyes for a longer period than usual, that double vision appeared. Her refraction, worked out under atropia sulph., (homatropine failing to quiet ciliary action) was, as corrected, this: O. D. + 0.25 D. S. ⊃ + 0.37 cy. axis 130°; O. S. + 0.12 D. S. ⊃ + 0.25 cy. axis 70°.

At the time of examination the Maddox Rod Test disclosed an exophoria of 4 degrees. The patient, although hyperopic, had, by a habit of squinting, acquired an artificial or functional myopia. Thus her features became distorted by a constant frown. Her facial expression was indicative of unrest, struggle and, at times, pain. A few weeks before consultation, she stated that she had an attack of la grippe, since which time her eyes had given her no rest—diplopia had been much more frequent and vision was constantly blurred and distorted. Manifestly this was a case where nervous compensation had, after years of effective struggle against defective refraction, at last succumbed to the inevitable, consequent upon inhibition of vital energy following an illness. But for the intervention of la grippe with its characteristic resultant lowering of vital forces, it is possible this patient might have struggled along for several years longer suppressing, by sheer dint of nervous energy, the otherwise imperfect visual image. I corrected the refraction with the weak combination above indicated. Three months later my record was: "No eye pain; no diplopia in 10 weeks; brow, formerly contracted, now relaxed; the 'squint' has left the eyes entirely; patient's personal appearance improved (in the estimation of her friends) 50 per cent." A year later the patient reports the satisfactory results noted above as still continuing.

Case No. 3, lady, age 39, referred to me by her family physician. She had been unsuccessfully treated for a species of apparently

spurious epileptiform seizures recurring every week or two. Her complaint was mainly of a severe pain in her eyes whenever using them, even if of only a few minutes' duration. Under atropine I was only able to discover a very low degree of astigmatism. I confess I was, in view of her strong asseverations of ocular misery, (which her haggard personal appearance plainly corroborated), surprised and disappointed in finding the degree of error so slight. But as it was "against the rule," no hesitancy was felt in advising its correction. The correction was as follows: O. D. + 0.25 cy. axis 40°; O. S. + 0.25 cy. axis 165°.

Record: "Entire relief of ocular trouble 10 days after wearing correction; can use her eyes with comfort for hours at a time." Two years later her family physician reported that her epileptiform seizures entirely ceased with the relief of her eye pain and she had never had one since; that her general health was vastly improved and her weight had increased 35 pounds. She is still constantly wearing the weak correction as indicated above.

Here, it should be remarked, was a woman of abnormally high sensitiveness of temperament who was growing functionally more nervous each month, with a steady decline in bodily and mental vigor under the irritating stimulus of constant eye-strain. True the cause (optical error) was slight, but with her peculiar temperament it was sufficient.

Now, what will the "doubting ophthalmological Thomas" say in respect to this case and its result? It is safe to anticipate that his answer will be this: that the lenses being of such low degree, acted much as does a placebo when administered in the course of therapeutics; that the results that ensued are to be attributed to mental impressions purely. The proper rejoinder is that inasmuch as every remedy known to the science of medicine had been previously and unsuccessfully invoked for the relief of this woman's seizures, may we not, if the lenses were the much and till then vainly sought placebo, continue their use on rational grounds alone? Modern therapeutics are not yet by any means entirely relieved from the ancestral taint of empiricism, and it is much too early for physicians to rally that as an argument against the utility of weak correcting lenses. Nor could that argument come at a time more inopportune than when the attention of the entire profession is being directed toward the scientific investigation and utilization in all branches of medicine, of hypnotic influence and suggestion. But I am unwill-

ing to concede that these lenses operated at all as a placebo or as a hypnotic suggestion—through mental impressionability either in whole or in part. It is quite as logical to suppose, especially in the absence of any attempt at hypnotic suggestion (for nothing was said about the possibility of curing the seizures by lenses—only the eye distress), a somewhat abnormal as well as overwrought nervous organism had been made worse by constant ocular irritation resulting from unsymmetrical axial astigmatism. Is it unreasonable to suppose that the vaso-motor system being sufficiently agitated, a loss of nervous equilibrium permitted the epileptiform seizures to follow? Relieving the cornea of its unsymmetrical axes by correcting faulty refraction, reflex nervous disturbance was annulled, thus permitting the agitated nerve centres to regain and maintain constant co-ordination. Must we at this late day stop to doubt and argue as to the possibility of remote disturbances of reflex origin when convulsions in children from dental irritation, for instance, finds a place in every text book on Diseases of Children and a ready acceptance by the rank and file of the medical profession? Is not the eye—asserted by some authorities to be the most sensitive organ in the body—as delicate in structure, function and relationship as the teeth? Therefore the smile of incredulity, if not of scorn, exhibited whenever remote nervous disorders are suggested as being of possible ocular origin, becomes quite incomprehensible. Were it restricted to the laity it would occasion little surprise, but from a body of men specially *trained to think* and to examine as to cause and effect, incredulity that is intolerant of investigation becomes inexplicable. But the smile of incredulity deepens when it is claimed that correcting eyes lacking assymmetry of axes by weak lenses can have any other possible effect than that obtained through mental impressionability alone. This contention cannot be admitted even though by so doing the desirability of low corrections would still remain. But to thus concede would be to degrade the science of refraction to a mere trick and set at naught the teachings of experience. I trust I esteem truth more highly than prejudice, and the lessons of experience far beyond the dicta of either "authorities," so-called, or ophthalmological nihilists. And, if so, in loyalty to both, I am compelled to enter an earnest protest against those who would inaugurate a crusade of ridicule against the employment of weak cylinders or lenses in the treatment and management of disorders originating in defective refraction.

In view of the foregoing, it may possibly be asked whether the correction of *every* case of ametropia of low degree should be undertaken? The answer would be unhesitatingly, "*Yes, if it becomes troublesome.*" No matter whether the ocular disturbance is by reflex return to the eye, or, as is most frequent, by physiological inhibition resulting in headache or cerebral abnormalism with consequent reflex neurosis, the refractive defect, however slight, should be corrected. It is quite true that neither high nor low degrees of error produce trouble *in all people*. In some instances considerable error is quite compatible with the utmost comfort. But who are they? Generally the non-sensitive—those whose occupation and habits keep them much out-of-doors—where the minimum of demand is made upon the eyes. For a limited time a very imperfect instrument may suffice for a slight amount of service, but for longer or continuous employment it is obvious that nothing less than perfection will suffice. The question of temperament and use must both be considered in the determination of the treatment of optical abnormalities. While ophthalmologists should not be expected to be neurologists, it is absolutely essential for the attainment of the best results that they be able to fairly approximate, if not accurately gauge, the quality and degree of the neural sensitiveness of their patients. This factor becomes as important in our final determination as the question of occupation.

The best refractionist is likely to be the one who brings to his aid not rules merely, nor skill and dexterity in the manipulation of instruments, but the keenest power of discrimination, the most delicacy of perception, and the finest quality of estimation, for only by the combined exercise of these will satisfactory and correct results be reached. Rules can never be formulated that will relieve the refractionist from the exercise, in every case, of sound judgment, which is the integral product of all the qualities enumerated above.

It is to be remembered that it is not so much the *degree* of the optical error as the nervous organism, habits and occupation of the patient that are to be considered. We should not expect to find in the hardy agriculturist, accustomed to the buoyancy of out-of-door life and unconscious that his body contains a nerve, the inhibition so frequently found in the accountant, the artist, the school teacher, the seamstress, etc. Here both temperament and occupation become controlling factors, and not the quality of the refraction alone. Manifestly we are to consider in every case the temperament, the

quality of the refraction and the uses to which the eyes are to be applied, allowing to each element its proper weight. If correct relationship of each element to the other be given, our final determination should and generally will, be unerring.

We are all, doubtless, cognizant of pathological conditions that have remained quiescent and benign for many years, suddenly asserting their baneful power, under the stimulus of some remote physiological disturbance, and overwhelming and destroying life. Patients frequently continue in the enjoyment of perfect health and comfort with a heart very imperfect in structure so long as functional perversion is very slight. But let the vital forces become depressed or compromised through any cause, such as overwork, mental anxiety, etc., and straightway the heretofore inoffensive cardiac defect becomes painfully if not fatally manifest. And why? Not because of the cardiac lesion, primarily, but rather because of the abridgement of the normal amount of bodily vigor which has hitherto sufficed to maintain nutritive equilibrium even in the presence of considerable structural embarrassment. With this balance disturbed, the cardiac muscle realizes and succumbs to its structural weakness. Though the lesion may have existed passively for a long time, it nevertheless lacked something more than its inherent defectiveness to threaten or destroy life. The lacking element is supplied when nutritional or energizing force becomes compromised or abridged. There is believed to be an element of latent weakness in every physical structure which becomes manifest only under the application of undue stress or tension. Thus it is that eyes "break down," so to speak; but why the eyes rather than the brain, the heart or the lungs, except for the pre-existing latent imperfection of that particular organ? And is not defective refraction a source of weakness? It certainly is not an element of strength. It is always the weakest link in the chain that snaps under extremes of tension. Under normal condition of structure, temperament, health and occupation could such a condition, popularly known as "eye-strain," ensue? With *normality of structure* and abnormality of health, temperament and occupation, is eye-strain as liable to occur as though that organ too were defective? Would it ever occur, indeed, with the first element lacking? Experience and observation extending over a period of several years, forces the conviction that it would not. But, given an optically imperfect instrument, a nervous organism of extreme sensitiveness, an occupation severely exacting, and we have the full comple-

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pia is capable of producing, I will refer, in
has come under my observation since I
this paper: The patient is a young girl,
ame choreaic, violent spasmodic twitching
of the prominently marked features of the
med me that the child had found it necessary
school life to study at night in order to keep
Her corrected refraction, worked out under
D. + 0.50 D. S. ⌒ + 0.75 cy. axis 35°;
⌒ — 0.50 cy. axis 115°.
case was referred to me by the family physician
to see (I quote his language) if the chorea had
Affected indeed! Fudge! With such a truly
r complicated with anisometropia, either of them
ing an almost limitless train of reflexes, is there
for an oculist of experience to question the origin
specially in the absence of any other *reasonable* as-
But the girl's physician calmly informed me, even
to him, that while he could not *discover any suffi-*
presumably bad refraction cut no figure in his calcula-
ther believed the chorea was due to worms (!) as
nes affected the eyes!" The enthusiastic but conscien-
, though sometimes accused of riding his pegasus far up
r, has never yet, to my knowledge, been credited with
to expel worms from the intestinal tract through the
of lenses placed over the eyes! Inasmuch as glasses are
med to possess vermifuge properties, they were not prescribed
case. In dropping the curtain upon this picture with its dark
of ignorance and bigotry, which thoughtful and painstaking
ts can contemplate only with mingled feelings of sadness and
ust, might not the fitting comment be summed up with entire
the exclamation: "*Bosh!*"

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M.D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Formula for Decentering Lenses. Dr. Baxter (Bangor) sends us the following formula for which he says he is indebted to Dr. W. S. Dennett (New York):

To tell how many millimeters to decenter a lens in order to add a prism of required strength, multiply the prism in degrees by nine and divide the product by the lens in dioptries. $M.=\frac{P+9}{D}$

Thus: How much have you to decenter a three dioptry lens to make it equal a 3 D. $\subset$ prism 2°? $M.=\frac{P+9}{D}=\frac{2+9}{3}=6.$

Referring to the table for decentering lenses shown on page 15 of Vol. I, No. 1 of THE REFRACTIONIST, this formula will be found to be practically correct. The formula will be found a great convenience.

* * *

Universal Trial Frame. Dr. Arthur G. Hobbs (Atlanta) in a recent letter puts the following questions: Why should we not reverse the numbering on the left trial frame? Can it not be done by common consent? Would it not simplify and accelerate refraction work?

There is certainly a need of uniformity in trial frames as every oculist realizes who has ever tried to interpret other physicians' prescriptions. We invite answers to the above. Dr. Hobbs proposes to give some reasons in the affirmative in an early number of this journal.

Selections.

The Clinic. *Torticollis Ocularis.* At the June meeting of this society I presented a patient suffering from spasmodic wry-neck, a disease of three years' standing, during which time the patient had been treated by all the known methods by many different and prominent physicians. One interesting feature of the case was the care with which he had recorded each diagnosis (and the diagnoses differed widely), by whom made, and the treatment. In my paper printed in the July issue of the *Clinique* (page 349) I gave my own diagnosis, reasons for arriving at that conclusion, and my method of treatment. At the time he was before the society he was slowly improving after being in my hands for two weeks. Within a month he was apparently a well man, and up to one week ago when I heard from him from Detroit he had had no return. The treatment consisted in carefully correcting refractive errors, which were of a high degree, with glasses, and his muscular errors by means of graduated tenotomies.

Now I consider this an extremely interesting case, and I will tell you why. The question whether refractive or muscular errors, or in a word, eye strain, is a cause of serious functional nervous disorder is probably to-day more in discussion and is occupying more of the attention of the profession than any other one question. It is discussed everywhere, in our special journals and in our general journals, in ophthalmological societies and in general medical societies. Here we have a perfectly healthy man with no hereditary taint, no personal vices, no history of traumatism or of anything else to account for a nervous disorder so serious as to disable him from following his occupation. We have a detailed history of his treatment, which comprised all sorts of internal and local treatment and mechanical appliances, as used by the best known nerve specialists in our part of the country. I do not claim any special credit for making the correct diagnosis. Every other one had been proven to be wrong, and the whole history of the case pointed to the eye as the reflex cause of the disorder. Others had not this history before them in all its completeness. However, the correct diagnosis was hit upon at last, the eyes were systematically treated, and a cure

resulted. This case is especially interesting for this reason. It proves as far as one case possibly can that eye strain is sometimes the cause of nervous disorder. No one can say of this case that the cure was the result of suggestion; that the cure was due to the physical effect of the operation, and that any other operation would have done as well. This man had had all sorts of things done to him by men much more imposing than myself and without any result whatever, but when the eye strain was relieved a cure followed as day follows night. In a person of less sound nervous make-up this reflex irritation might have resulted in explosions of the cortical cells—epilepsy. Later I hope to make my second report upon the eye treatment of that disease.

In closing let me guard against any mistaken conception of the meaning of this paper. It does not mean that every case of wryneck is ocular in its origin; but it does mean that before the examination is complete, in functional nerve disease, the eye must be looked to, and it will be found as often at least as other parts to be the seat of the reflex irritation.—*Dr. C. J. Swan in the Clinique.*

* * *

Only One Third of the Total Hypermetropia Manifest; Multiplicity of Subjective Symptoms. Mrs. E. E., aged twenty-nine years, a healthy, strong woman, came to me in January, 1894, declaring that she "must have some dreadful disease of the eyes." She complained of: 1. Very indistinct vision. 2. Being unable to read by gaslight. 3. Frontal headache and pain in the eyeballs. 4. Mental confusion upon trying to distinguish objects. 5. Insomnia, that she was certain was caused by the condition of her eyes.

She had always had poor vision; she remembers that when she was a little child at school she had difficulty in distinguishing characters upon the blackboard, and in reading, the letters often ran together, and she would frequently stop at that time and rub her eyes, finding that gave some relief and for a brief time enabled her to see print more clearly.

In the early part of December, 1893, she had an attack of influenza, and since that time her vision and her headaches have been decidedly worse. She was extremely nervous.

Right, vision $=\frac{20}{100}:\frac{20}{50}$ — w.+ 2 D. combined with + 0.75 D. cyl. axis 90°. Left, vision $=\frac{20}{70}:\frac{20}{50}$ w. + 2 D.

The ophthalmoscope showed a normal condition of the media and

fundi. Refraction: Right eye, + 6 D., with + 1 D. astigmatism; left eye, + 6 D.

Examination of the Ocular Muscles.—1. Hyperphoria, R. 1.5°. 2. Esophoria, 2°. 3. Adduction, 16°. 4. Abduction, 6°. 5. Sursumduction—R., 2.5°; L., 1°.

This patient's eyes were put under the controlling effect of atropine, and three days later the following result was obtained:

R. V. = $\frac{4}{200}$: $\frac{20}{30}$ + with + 6.50 D. combined with + 1.25 D. cyl. axis 90°. L. V. = $\frac{6}{200}$: $\frac{20}{30}$ + with + 6.50 D.

Before accommodation was restored the following glasses were ordered for constant use: R., + 4.50 D. ⊃ + 1.25 cyl. axis 90°. L., + 4.50 D.

After the mydriatic had ceased its effects vision was found to be: R. = $\frac{20}{100}$, without a glass. L. = $\frac{20}{70}$, without a glass. Each eye, with a glass, = $\frac{20}{20}$ +. The two eyes together, with glasses, = $\frac{20}{15}$. With these glasses she read Jaeger No. 1 at from seven to eighteen inches. Without her glasses she could read only Jaeger No. 3, and with pain and difficulty.

She was requested to return in a month to report her condition.

In February, 1894, she returned and stated that all her asthenopic symptoms had disappeared. All objects, whether near or distant, were plainly seen. Her glasses continue to give her satisfaction and comfort. She even slept well, whether she read in the evening or did not use her eyes for near work.

Her forehead was deeply furrowed with verticle lines between the brows, the palpebral fissures were contracted, and she had an anxious, troubled countenance, as if uncertain what to do. All this facial expression changed as her other asthenopic symptoms disappeared under the proper correcting glasses.

Two Thirds of the Total Hypermetropia Manifest; Distressing Asthenopia. Ida W., aged twenty-five years, a delicate, overworked young woman, was sent to me on January 3, 1894, by a philanthropist whose special interest is in working girls. The patient was employed in the "stamping of linen," an occupation demanding close application of the eyes for many hours a day—an "asthenopic occupation," as Dr. Roosa calls such work—*i. e.*, "an occupation which will produce asthenopic symptoms in eyes that would otherwise probably not be complained of."

She gave the following history: At the age of twelve years she had an attack of spinal meningitis; was ill then nine weeks, being

delirious the greater part of the time, and made a slow recovery. Since that time she has always suffered from severe headache, at times being quite overcome by the pain and obliged to go to bed. This was regarded, both by the physician who attended her and by her own family, as the result of her serious illness before mentioned. When she came to me her subjective symptoms were as follows:

1. Constant headache, which was always worse in the afternoon. 2. Indistinct vision for distant objects. 3. The necessity of holding her head low to see lines at her work upon the table. 4. Nervousness. 5. Tired and painful eyeballs. 6. Drowsiness.

The eyelids drooped, and her facial expression was sad and dull, though her conversation was good. She looked drowsy, and seemed to require encouragement even to complain.

Vision $= \frac{20}{100} + : \frac{20}{20}$ — with + 4 D., each eye. The ophthalmoscope showed normal media and fundi. Refraction: + 6.50 D., each eye. No astigmatism. Muscles in equilibrium. As this patient could not afford time for a more thorough examination under atropine, she was given the strongest convex glasses with which she could procure distinct vision, thus correcting only her manifest hypermetropia, which was, as above recorded, + 4 D., each eye.

She was ordered these for constant use, and will be expected to accept a stronger correction in the course of a few months, as she gradually relaxes accommodation under this correction. As soon as the glasses were put on she experienced a sense of "rest," as she called it. She returned in three weeks, on February 1st, and the change in her expression and manner was quite noticeable. Her eyes were "open" instead of half closed, her face had lost the sad, dull look, and her manner was confident and cheerful. She stated that her headaches had disappeared, and that she was no longer drowsy, even though often up late at night.

Her vision was then $\frac{20}{15}$ with her glasses, and she read Jaeger No. 1 at from eight to twenty inches. Her own statement was: "I seem to have gotten out of a gloom that covered everything before."—*Dr. Hennessy in N. Y. Medical Journal.*

THE REFRACTIONIST.

The Exponent of the Refraction World.

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MY TEXT—A CASE IN PRACTICE.

BY E. E. HAMILTON, M. D., WICHITA, KANS.

MISS C., aged 28, teacher in high school, consulted me May 28, 1893, about her eyes. Has always had trouble, particularly in doing close work by an artificial light. During the year just past she had much more trouble than before, as her employment has demanded their constant use. Can now read but a few minutes without a feeling of discomfort; complains of dimness of vision, and much pain in eyes and head, chiefly frontal in character. Discomfort not confined to her near work. Often has confused and uncertain vision for distance,—a tendency to giddiness and nausea when riding, or walking in a crowd. Health good. Weight 160 pounds. Both the ocular and palpebral conjunctiva are congested; palpebral margins red and covered with brany scales.

Her vision is: R. E., $\frac{20}{50}$, w. — .75 D. ⊖ —.75 D. cy. ax. 60° = $\frac{20}{20}$ +. L. E., $\frac{20}{50}$ +, w. — .75 D. ⊖ — .50 D. cy. ax. 120° = $\frac{20}{15}$.

Esophoria, 6. Right Hyperphoria, 3. Adduction, 25. Abduction, 6.

These glasses sharpen vision decidedly, but feel uncomfortable. The opthalmoscope shows a clear media and normal fundus, seen best with about 2.00 D. plus spherical glass. Had eyes fitted six months previously by a traveling oculist from N. Y. City, of 30 years' experience. He had given her — .75 spherical for each eye, instructing her to wear them constantly and her painful symptoms would soon subside. He had told her a mydriatic was unnecessary,—even harmful; that the best oculists had entirely discarded mydriatics.

She had worn the glasses as steadily as she could for two or three weeks, and then had abandoned further attempts as they aggravated her painful sensations. I then instilled a five per cent. solution of homatropine hydro-bromate, (Mercks) eight times into each eye, at intervals of five minutes, taking care to drop it directly on the cornea, and to hold the lids apart to prevent its being washed away. Thirty minutes after the last instillation I examined her vision with following results:

R. E., $\frac{20}{30}$, w. + .50 sph. ⊂ — .75 cy. ax. 60° = $\frac{20}{20}$ —. L. E., $\frac{20}{30}$, w. + .50 sph. ⊂ — .50 cy. ax. 120° = $\frac{20}{15}$.

Feeling sure she was still accommodating, I gave her a one per cent. solution of atropia sulphate, and instructed her to use it four times a day for four days and return. Her vision was then:

R. E., $\frac{20}{70}$, w. + 2.00 sph. ⊂ + .75 cy. ax. 120° = $\frac{20}{20}$ +. L. E., $\frac{20}{70}$ +, w. + 2.00 sph. ⊂ + .50 cy. ax. 160° = $\frac{20}{15}$.

I ordered at once: R. E., + 1.25 sph. ⊂ + .75 cy. ax. 120°. L. E., + 1.25 sph. ⊂ + .50 cy. ax. 60°, and told her to wear them constantly waking hours. I also gave her a four per cent. solution of boracic acid as a wash, and a white precipitate ointment (one per cent.) for the blepharitis. At the end of two weeks her vision for a distance had become reduced to $\frac{20}{40}$. Says objects seem distorted,—floor not level. Two weeks later her vision was $\frac{20}{30}$. Thinks she still sees clearer without the glasses. Has ceased to notice distortion of objects. At the end of ten weeks she reports vision good, better than without the glasses,—floor level; still has a dizzy and uncertain gait when walking, and headache. Says she can read better with one eye covered. Esophoria, 3°. Hyperphoria, 3°. Adduction, 20°. Abduction, 6°. Reads Jaegar, No. 1, readily at 12 inches. Performed tenotomy on right superior rectus muscle. Think I severed tendon co-extensive with its point of attachment, being careful not to disturb the fascia. Result, vertical equilibrium. Two weeks later 1° hyperphoria still remained and 3° of esophoria. Patient expresses herself greatly relieved. Nearly all her unpleasant sensations gone. Can use her eyes much longer than ever before. Conjunctival congestion and blepharitis nearly removed. December 28, 1893 she called to inform me, she thought her eyes were well, and to express her appreciation for my services. She still had one degree of hyperphoria, but only two degrees of esophoria.

I do not report this case because of its rarity. You all have, not

infrequently, seen similar ones. Neither do I hope to offer anything new or original in the management of such cases.

My apology for reporting it is simply because it represents a type of asthenopia, having many of the conditions present necessitating eye strain,— the important factor in the production of asthenopia.

Ever since the impetus given by Donders when he presented us his masterful work on "The Anomalies of Refractions and Accomodation," oculists the world over have been trying to solve the problem of eye strain. After a third of a century of labor, it is interesting to note the wide divergence of views entertained on the part of those of national and international reputation, whose large clinical experience ought, it would seem, to make their opinions in such matters authoratative. In view of such an absence of unanimity of opinion, what is the conscientious searcher after truth to do? Obviously nothing but to exercise his own individual judgment, not ignoring the advice of his seniors in years and experience, but appropriating what he believes to be best, and putting it to the crucial test of experience in actual practice. After all it is not strange, I think, that we are unable to formulate any mathematical, "cast iron," rule for our guidance. The eye is not a mere machine. It is a living, innervated entity, having the human body for its environment, its condition and that of its appendages, modified by bodily conditions, temperament, use and abuse in the demands of modern civilization, etc.

Reverting to our case in practice, let us notice a few points in dispute, the opinions entertained about which will necessarily modify our treatment of similar cases.

1. Is the normal eye emmetropic or hypermetropic?

2. Is latent hypermetropia exceptional and inconstant, and not present more frequently in childhood or early adult life than in middle life?

3. Will the correction of the astigmatism alone eliminate the asthenopic symptoms, or would there still remain a residuum of eye strain sufficient to cause discomfort?

4. In estimating errors of refraction correctly, is it or is it not necessary to suspend the accommodation?

5. Can the condition of the extrinsic muscles always be ignored in our management of asthenopia?

I cannot hope to settle the dispute. I can only record my own conclusions, based on individual judgment and my experience during

the past seven years in the correction of several hundred cases of hypermetropia, with and without astigmatism.

First as to what constitutes the normal eye: we must admit that the hypermetropic eye is the common eye,— more common no doubt than the emmetropic or the myopic, or both combined, but in this admission we do not grant you it is the normal, the ideal or perfect eye. To have a good model, a standard to which we wish to attain, we must in my opinion accept the emmetropic eye. Anatomically it nearest approaches perfection; in the exercise of its functions, it requires a minimum amount of nervous expenditure; is least apt to become asthenopic and least apt to become affected with pathological changes. The element of frequency, to my mind, has nothing to do with the case. The question is which condition of the refraction, the emmetropic or hypermetropic, is theoretically and practically the most perfect. So long as the general health remains good, the nervous impulse is given to the ciliary muscle to compensate for quite a degree of hypermetropia, and visual efforts are not painful; but let the health become impaired, or the necessity for additional work arise, or both, and which will suffer first? I find recorded in my case book numerous cases of asthenopia, where no error could be found but hypermetropia of .75 to 1.00 dioptry. In my experience hypermetropes of 2.00 D. very frequently indeed are asthenopic, and are entirely relieved with convex spherical glasses. If these low degrees of hypermetropia cause asthenopia, why will not they be factors in its production, too, when astigmatism is present? I cannot believe I would have done my duty toward my patient, had I not given her sphero-cylinders.

I am sure we all appreciate the importance of correcting the full amount of astigmatism. Donder's dictum that 1.00 D., or less may be ignored in all cases, would hardly be accepted by modern opthalmologists. My practice is, in asthenopia, to correct as low as .25 D., particularly if against the rule, oblique or if it requires the axes of the cylinders to be placed unsymmetrically. In fact I am inclined to think no amount of astigmatism is normal, in the presence of asthenopia.

The claim that latent hypermetropia is exceptional and inconstant, if by that is meant during the period between childhood and 40 years, will hardly be accepted I think. I am sure there is a consensus of opinion against it. I have been taught that "the diminution of the accommodation takes place with perfect uniformity from youth

to age,"— no recessions or sudden advances, so long as the general health remains good. Certainly this tallies with my observation. I will admit the accommodation is still active at 45 years or later, in some instances, but the claim that latency of hypermetropia is least frequent under 20 years, and most frequent between 45 and 50 years, seems to me unfounded. When tested subjectively with the test type and trial lenses, during the period of active accommodation,— say under 40 years, the patient being in good health, the hypermetropia manifest, unaccompanied with hypermetropia latent, in my experience is the exception. In such a case I should interrogate the patient's general condition. Indeed, I often find one and two dioptries, even much more, entirely concealed in young subjects, and not infrequently there is found a condition of accommodative or apparent myopia.

The claim that hypermetropia latent is found to be the exception, I cannot believe is true, unless the result was found with the opthalmoscope. It is well known the patient's accommodation usually relaxes, when the mirror of the opthalmoscope is brought close to the eye, as in the direct method. Believing then as I do that the emmetropic eye is the normal and ideal eye, and that in accommodative asthenopia in the presence of hypermetropia or hypermetropic astigmatism, or both, a correcting glass should be given, making the condition as nearly simulating the emmetropic eye, as is possible consistent with good distant vision and the patient's comfort. (There may be some anomalies of the extrinsic muscles, that would cause me to modify my practice here.)

Believing that the manifest error with the test type and trial lenses is often far from being the real one, it follows as a necessary corollary that I believe an accurate estimate of refractive errors can only be made with a completely suspended accommodation; that in every case of hypermetropia or hypermetropic astigmatism, under 40 to 45 years, I would use a mydriatic.

In my case you will remember that homatropine failed to thoroughly suspend the accommodation, though used much stronger than advised by most oculists who have confidence in its virtues. It has failed me in several instances. While in a large majority of cases it will accomplish the desired result, I have much more confidence in atropia. I always use homatropine under mental protest, and fortify myself by telling my patients of the possibility of having to use an agent whose effects are more certain, but more lasting. By so doing

they understand that if homatropine fails, I do not assume full responsibility unless I follow it with atropia. I like, too, the lasting effects of atropia, as I like to put glasses on a patient with fully suspended accommodation. I believe the correction is then accepted more readily. In asthenopia, when the refraction is hypermetropic, I correct all degrees over .75 D., allowing .50 to 1.00 D. for the tone of the ciliary muscle. While theoretically the full correction would be proper, practically I find the ciliary muscle will not submit to the inaction. Indeed, in high degrees, in young vigorous subjects, I have been compelled to weaken the glasses or lose my patient, as the blurring of distant vision was too uncomfortable.

With unsuspended accommodation, my patient accepted only concave cylinders, while under the mydriatic she accepted convex cylinders at right angles. To avoid the error of giving minus cylinders when plus ones are needed, a mydriatic should be used.

The distortion of images, particularly when cylinders are placed obliquely, you have all observed. These disturbances of ocular perceptions ("binocular metamorphopsia"), as a rule soon pass away when the glasses are worn constantly.

That the blepharitis and conjunctival congestion was due to eye strain there is no doubt. The boracic acid wash and mercury ointment had little to do with the case, further than to satisfy the patient's mind. The real element in the cure was the removal of the strain.

The concave glasses given by our traveling oculist (?) added fuel to fire. Notwithstanding the weight of his years and 30 years' experience, we still remain unconvinced that a mydriatic was unnecessary.

(Why do preachers and teachers so seldom profit by sad experience, or am I mistaken in my impressions that they are most often the victims of quack spectacle venders.)

As to the part that aberrations of the extrinsic muscles play in the production of asthenopia, I shall have but little to say. I have already taken too much of your time. The criticisms, pro and con, have been acrimonious,—often not becoming the profession. Before we criticise a professional brother's practice as harmful, we should be able to demonstrate scientifically our own opinions. While of the opinion that a large percentage of muscular errors are due to the disturbed relationship between accommodation and convergence, and will mostly take care of themselves after a careful correction of

refractive errors under a mydriatic, I am just as strongly of the opinion that this relationship does not exist in all cases. Some, I am convinced, are primary,— inherent if you please. On the theory of abnormal tension, I do not account for esophoria accompanied with myopia, or exophoria with hypermetropia, on any other hypothesis. I have learned to attach importance to examinations of muscular conditions.

Whether the hyperphoria which seemed to contribute its share towards the production of my patient's discomfort, was inherent or acquired, I have no means of demonstrating. It seemed to be a stable condition despite her correction, and easy binocular fixation did not occur until the tension of the superior rectus muscle was relieved by a tenotomy, as is evidenced by the removal of her asthenopic symptoms. In view of the many conflicting opinions on this subject, a safe ground is a standpoint of conservatism. Let us make each case a law unto itself, and treat it on its individual merits. So far I have no reason for regretting the course pursued in the treatment of my case in practice.

A CLINICAL MANUAL OF DISEASES OF THE EYE, INCLUDING A SKETCH OF ITS ANATOMY.

By D. B. St. JOHN ROOSA, M.D., LL.D.

Professor of the Eye and Ear in the New York Post-Graduate Medical School and Hospital, Surgeon to the Manhattan Eye and Ear Hospital, President of the New York Academy of Medicine, etc., etc. Illustrated by one hundred and seventy-eight engravings and two chromo-lithographic plates.

THE author of this work has been known for years as the author of "The Diseases of the Ear," which is so well received that it has been translated into several foreign tongues. Contrary to what many have thought, Dr. Roosa is not a pure ear specialist, but particularly interested in the diseases of the eye as well as those of the ear, and it is therefore with interest that we take up this new work. The idea of the work is expressed in the preface: "It is presented to the profession because I have not deemed that the debt I owe to it could be even approximately satisfied, nor my own reputation as a teacher, whatever that may be, justly settled, unless I presented in a permanent and accessible form some of the results, with their personal coloring, of my long experience. . . ." The volume is divided into thirty-three chapters, has one hundred and seventy-eight engravings, two chromo-lithographs, a glossary, an index, and an index of authors alluded to in the text. The first thing that we notice in glancing through the volume is its characteristic American feature; that is, it mentions every one who has done anything to advance ophthalmology on this side of the Atlantic, and yet gives due credit to all European and English authors; in this respect it is essentially different from our trans-Atlantic writers, who are very apt to be intensely local, and to know only what is done in their own country; this is particularly true of the Germans, so that we may truly say that this volume is cosmopolitan in every sense.

Part I. contains a "Sketch of the Anatomy and Physiology of the Various Parts of the Eye and its Appendages," one hundred and fifteen pages being devoted to this part, one-fifth of the volume; the cuts are good, and fourteen of the thirty-nine are new and made from fresh specimens, by Dr. H. T. Potter; this is to be very highly commended, as it is too much the habit to copy plates from others.

We are sorry not to see a more full exposition of the lymphatic system of the eye, which is an important factor in so many diseases of that organ. Otherwise the chapters are full and lucid in style.

Part II. treats of the "Relative Frequency of Different Diseases of the Eye, Methods of Examination, Therapeutics and Surgery of the Eye."

Chapter VI. is interesting, and shows the frequency of the various affections of the eye in a total of 608,002 cases, taken from both private and dispensary practice, as follows:

Diseases of the Conjunctiva,	30	per cent.
" " " Cornea,	21	" "
Refraction and Accommodation,	14½	" "
Diseases of the Lids,	9	" "

and so on, through the remaing 25 per cent. Roosa's and Cohn's tables are almost identical, except in the higher percentage of errors of refraction noticed in this country, due probably to the more careful examination of optical errors, — as it is a well known fact that our German colleagues pay far less attention to these refractive conditions, being more absorbed in micro-organisms.

Retinoscopy does not meet with favor in the author's practice, and we cannot understand how it can be so much vaunted by others for simplicity, for in our experience it is the most difficult means of readily determining errors of refraction.

Considerable space is devoted to the description of the Ophthalmometer, and a figure is introduced showing the method of using it, and it is evident that the author considers it of great value, which in fact it is, as no careful ophthalmologist to-day would be without one. Not only is it a time saver, but also a corroborator by other methods. Much of the popular use of this instrument is due to the active work of the author, Dr. Roosa, in bringing it to the attention of the profession.

Part III., "Diseases of the Eyelids, Lachrymal Apparatus, the Conjunctiva, Eyeball, and Orbit," is treated of in over two hundred pages, and sufficiently illustrated to make clear the text. In speaking of sympathetic inflammation of the fellow eye, he says: "The weight of testimony is on the side of the origin of the disease being on the ciliary nerves, and that the process is either a reflex or metastatic one from one set of ciliary nerves to the other." Deutschmann's bacteria views of transmission by means of the optic nerve sheaths are considered not proven.

The advice to enucleate all offending eyes early, and not to wait until sympathetic inflammation is established is wholesome; and we are glad that enucleation is insisted on, instead of some of the other makeshifts, sometimes advanced by writers. In speaking of toxic amblyopia, the author says that he is an agnostic as to amblyopia from tobacco alone, and gives some very cogent reasons for his position. We have never seen a case of pure tobacco amblyopia. When speaking of chronic Glaucoma, the author says, "Insidiously and steadily advancing, iridectomy offers so little that I am always willing to temporize with the instillation of eserine as long as it keeps the eyeball to a normal standard, and the accommodation and vision are not failing." We quite agree with the author, when speaking of lenticular opacities which cease to advance without any treatment whatever, and would go farther and say that we have seen opacities in the lens clear up without treatment, and this also on a patient having a cancerous disease. We have no faith in the treatment by massage.

In the treatment of cataract cases, the author adopts the conservative method; namely, bandaging, comfortable position, and moderate light. All the statements about cataract and its treatment are sound and exceedingly interesting.

Part IV., "Errors of Refraction, Accommodation, Strabismus and Affections of the Ocular Muscles," is treated of in one hundred and forty pages, and concludes the volume.

It is particularly in this portion of the book that the views of the author are especially set forth, and in various respects he differs from many. He says, "Asthenopia may be divided into true or local, and the false or symptomatic. I regard true asthenopia as that which depends upon a refractive anomaly, and I consider that as symptomatic or false, which depends on some error in the general nutrition, neurotic condition, nervous exhaustion, or the like." The author is not in accord with those who believe that the body revolves around the eyeball as a centre, and consequently does not believe in chorea, epilepsy, and insanity as a result of ocular strain. He further says: "Although I formerly accepted the ordinary classification of an asthenopia dependent upon insufficiency of the external ocular muscles, I have come finally to reject it altogether." And it would appear from the subsequent paragraphs that he ascribes most of the causes of asthenopia, formerly considered by him as muscular, to small degrees of astigmatism and hyperopia or both.

Further he says: "In my opinion the very best that can be done for them is to make rather light of these troubles, and correct the astigmatism . . . so long as one does not advise prisms or operations on the muscles, the patient will do fairly well by using convex glasses." We can agree with the author only in so far as the proper correction of refractive errors, and most decidedly are of the opinion that there is a class of patients in whom there is no neurotic element, and no lack of physique, in whom there still exist an improper balance in the external muscles of the eye, and that such only are helped by the addition of prisms to the proper correcting glass. At the same time we wish it distinctly understood that we have no sympathy with the "Partial tenotomy-ites."

Nasal asthenopia is not much thought of by the author, his experience having taught him that astigmatism is the cause in most instances. Our experience would lead us again to differ in this. In all other respects we are in accord with all the statements on asthenopia, they being based on long experience.

"The most deplorable results have occurred in my own observation in consequence of the long continued effort to restore the muscular balance of the eyes. In two cases known to me enucleation of a sound eyeball has been performed at the request of the patient . . . with which he was able to see distinctly," says Dr. Roosa. The reviewer can state that one of these patients is to-day still a neurotic individual, and bears out the truth of what the author says as to constitutional or false asthenopia.

The chapters on the Errors of Refraction are exceedingly full and practical; when speaking of astigmatism, he says that corneal astigmatism need not be corrected, unless it exceed one-half a dioptry. We are all, I am sure, except in a neighboring city, in accord with the following statement: "I cannot too strongly argue against the use of a mydriatic in those over forty years of age in the determination of refractive conditions."

Part IV. is one of the best in the volume, and except in the statements in reference to the use of prisms in muscular asthenopia, the author is in accord with the writers of the present day. We trust he will still find cases in which the neurotic element does not prevail, and in which prisms will be of infinite value. Nothing but praise can be said of the work as a whole, and it embodies a large experience of a close clinical observer. We commend it heartily to both physicians in practice and students. The publishers have done their work well; we have only to regret that chromo-lithography in this country does not come up to the standard of that abroad, especially in matter of coloring. We shall look for a second edition very soon.

W. O. M.

"The Universal Trial Frame."

EDITOR "THE REFRACTIONIST." *Dear Sir:*— Replying to your invitation for suggestions in regard to the "Universal Trial Frame" idea of Dr. Hobbs, as set forth briefly in your editorial in the January number of THE REFRACTIONIST, I have this to say: If I interpret Dr. Hobbs rightly, when he says, "Why should we not reverse the numbering on the left trial frame," he means that the numbering should begin at the nasal side of the frame and run towards the temporal if above, and at the temporal side and run towards the nasal if below. The present frames universally in use are so numbered that if the notation is above, that the numbering on right side runs from nasal to temporal, and on left side from temporal to nasal. I can see only one advantage in the "Universal Trial Frame," so called by Dr. Hobbs, and that is, that where a cylinder is accepted at an oblique axis, say 15° to the temporal sides of vertical, we would have both axes at 105° instead of O. D. axis 105° O. S. axis 75°. The great objection to this change is that it will upset the readings of the ophthalmometer when used on the left eye. It would be necessary to have a special ophthalmometer made with the numbering on the disk reversed to use on the left eye, and to continue using the instrument we now have for the right eye. In short, two ophthalmometers would be required. In as much as this would involve an outlay of money, and crowd our offices with unnecessary apparatus, I believe this one objection to be sufficient to warrant us in leaving the trial frame at present in use unchanged.

Those who do not use the ophthalmometer will not appreciate the point just made, but to the vast army who do use them, it will appeal at once, for we can not get along without the ophthalmometer, and yet do not want two of them, when one at present answers all purposes. Until every oculist had discarded the trial frames now in use, and adopted the new, and opticians universally dropped into line, the utmost confusion would be the result. For my part, I cannot find fault with our present trial frame, and prefer to see it stand unchanged.

Respectfully yours,

G. MELVILLE BLACK, M. D.

DENVER, COL., Feb. 19, '95.

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M. D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or receipts.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

The Signs of The Times.

Below are extracts from a letter received from a general practitioner, and is one selected from many which have been answered personally. These letters are indicative of the desire of many who are at a distance from refractionists, and are trying to do the proper thing for their patients. In a recent exchange we saw the statement by an oculist in a distant part of the country, that he did not believe in having an oculist at every cross-roads. We believe it is more sensible to have a physician who knows *something* about refraction, than to take the chances of having the ground preoccupied by a "mongrel optician," which will surely be the result. Such a physician is certainly in better condition to determine what cases are beyond his knowledge, and in a better environment to increase his knowledge scientifically.

An optician (?) of this city (to whom a number of the oculists *still* allow their prescriptions to be taken), recently advertised to advise people whether they needed to consult an oculist or not. This is a sample of what will be, not only in our large cities but at every cross-roads, unless the oculists crush or try to crush it out. To this end THE REFRACTIONIST was "brought forth," and it calls on the oculists of the country to be more careful not to encourage this snare.

"*Dear Sir:*— I write to ask your rule about fully correcting Hyperopia and Myopia, with or without astigmatism, in young persons from 18 to 25 years of age, where atropia is used to paralyze accommodation, and you find that it requires say: R. + 1.25 D. ⌒

+ .75 D. ax. 100° L. + 1 D. ⌔ + 1 D. ax. 90° to make vision $\frac{20}{20}$. Would you give *full strength?* Some books say give within 1 D. of full correction where strong lenses are required, and many expensive books hardly refer to it. I fitted a case yesterday where + 1.50 D. ⌔ — 50 D. ax. 180° over each eye, gives a vision of $\frac{20}{20}$. Now, what lens would they wear with comfort for reading, and what for general use without thinking glasses too strong, etc.? . . . If you will kindly give me rules as to what proportion of the hyperopia to correct at different ages, it would aid me greatly. . . . I have been interested in fitting glasses several months, *know little* and seek to *know more.*"

Now, more light is what this physician desires, and let us assist in giving him more light if we can. In the first place there are no absolute rules that will apply to all cases. General rules may be formulated, but for the most part, each case will have to be studied by itself, and the decision arrived at as a resultant of previous reading and experience. In fact, this resultant comes to us almost intuitively in time, at any rate the successive steps to our conclusions at times would be hard for the inexperienced to follow. To the first case (aged 22) with only 1 D. of hyperopia, it will doubtless give complete relief to correct the astigmatic error and order the glasses to be worn constantly. In many cases this will give relief if there is as high as 3 D. of hyperopia. Above that amount, the experience of the writer has been that it is seldom necessary to correct more than half of the hyperopia, plus the corrections of the astigmatism for near work. The correction of the astigmatism will generally suffice for distance unless there is a manifest hyperopia, when that should also be corrected. In this case, for near work add about + 2.50 D. to the correction for the manifest hyperopia and the astigmatism.

In the second case + 1.50 D. ⌔ — .50 D. ax. 180° the combination is not correct, or rather the preferable and simpler way is + 1 D. ⌔ + .50 D. ax. 90°. This makes it similar to the first case, and the same suggestions will apply. This error in working out refractions *i. e.*, combining a + spherical with a weaker — cylinder, is not confined alone to novices in the work. It is occasionally seen in the prescriptions of those whose experience should teach them better. If the above transposition is doubted at all, try a — 1 D. ⌔ — .50 D. ax. 90° over each combination, and see if it will not neutralize each. "Things that are equal to the same thing are equal to each other." An axiom of our early boyhood.

Spectacles or Eyeglasses.

Practically this is an important question, and while the weight of opinion in the past has been on the side of spectacles the following by Dr. Hansell, in a recent number of the Philadelphia Polyclinic, if fully carried out, would be pleasing to the large number of patients, especially females, whom the oculist has to treat:

"The custom among oculists of prescribing ametropic corrections for constant wear in cases in which pain can be relieved or vision improved, has led to an enormous increase in the number of people who sacrifice appearance for comfort. It is not an unimportant consideration with most persons that they present as good an appearance as circumstances will alllow, and to the patient of the oculist or customer of the optician, the question is pertinent: 'Can my lenses be worn as eye-glasses?' It will be admitted that spectacles are an unbecoming addition to anyone's face. However light, the screws in the lenses and the fastenings of the hooks as well as the hooks themselves are conspicuous, and materially alter the wearer's expression. Eye-glasses are unquestionably more becoming. They are neater, more graceful, smaller, and their means of support practically invisible. The advocates of the spectacle frame claim that it will not fall off, will maintain its position on the nose and, therefore, hold the lenses in their proper adjustment, is comfortable and durable, and though in appearance objectionable, is therapeutically to be preferred.

"On the other hand, I contend that the eye-glasses, the 'Pince-nez,' offers decided advantages, and should be chosen by the large majority of those who must wear one or the other. The minority consists of those whose occupations demand severe bodily exertion, stooping position or exposure to the weather, or who have deformities of the root of the nose.

"Spectacles indent the nose, cut the ears, are awkward to handle, are liable to be bent as they are being thrust into the case, and require constant attention, and frequently the aid of the skilled mechanic, to maintain accurate adjustment. The eye-glass is less conspicuous, is more convenient, particularly when far and near corrections must be worn, and will support a lens with precision equal to the spectacle frame, including cylinders and prisms, and, having a firm spring and no bars or long hooks, is far less likely to become bent and the lenses out of their proper axes or centres. I,

therefore, prescribe glasses whenever in my judgment the conditions are favorable."

We agree with the writer fully, as he has specified for constant use.

For near work wholly, however, we think spectacles are more practical in many cases. It is difficult to adjust eyeglasses to some noses, either the offset in ordinary guards so as to get the axes and angles right for reading, sewing, etc. To obviate this it has been our custom where there is no opposition (and generally if there is any opposition at first it is easily overcome by a little explanation), to provide spectacles half eye (pulpit or clergymen's glasses) with the lenses decentered properly downward, as as to get as exact results as possible. The frame should have a *hoop* bridge instead of a *saddle.* The bows may be riding bow or straight, as the patient desires.

* * *

How Do You Suppose He Got It? We recently saw a prescription written by a reputable oculist where the axis of astigmatism in the right was 68°, and in the left, 96°. It is amusing to consider how this accuracy was obtained. Opticians must have as much ridicule for such work, as the druggists do over some of the "shot-gun" prescriptions they receive. Who believes that such work will be set up correctly, or that it is possible for a patient to keep it correctly on the face if prepared as directed? Is this work practical? We consider it akin with .125 D. lenses.

* * *

Our Good Intentions. THE REFRACTIONIST has been unavoidably delayed for the past few months. With the beginning of Volume II. in April we shall endeavor to go to press earlier in the month.

* * *

Back Numbers. All of our subscribers with one exception have requested back numbers of THE REFRACTIONIST. We have more copies that we can supply new subscribers. Your subscription will aid us in making the journal more acceptable to the profession. Articles are also solicited on any branch of refraction work.

THE REFRACTIONIST.

The Exponent of the Refraction World.

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A SIMPLE METHOD OF WORKING OUT COMPLEX REFRACTION CASES.

BY CLARENCE R. DUFOUR, PHAR. D., M. D., WASHINGTON, D. C. Opth. and Otol. to Sibley Memorial Hospital; Opthalmologist to Eastern Dispensary; Instructor in Opth. and Otol. Georgetown Medical College, Assistant in Eye and Ear Department Central Dispensary and Emergency Hospital.

IT frequently happens that beginners in refraction work do not understand how to work out and to write just what they find in complex cases. To make myself better understood, let me illustrate. An office case is found to be one of ametropia, by the different methods of examination which should always be employed, viz.: Skiaskopy or shadow test, direct method with the opthalmoscope, test lenses, and if possible the opthalmometer, which should all agree, (one verifying the finding of the other); the error is found to be + 3.5 D. ⌔ — 4.5 D. cy. ax. 180°. How should this be written?

A simple way to work out these cases is thus: + 3.5 D. — 4.5 D. = — 1 D.

A + 3.5 D. being a spherical glass exerts its action in all meridians. (See figure representing the vertical (90°) and horizontal (180°) meridians.) The — 4.5 cylinder axis 180°, according to the rule that a cylinder refracts at right angles to its axis, exerts its action on the vertical meridian. We have then in the vertical meridian a + 3.5 D. and — 4.5, which equals — 1 D. the + 3.5 D. Sph. is undisturbed in the horizontal meridian. Therefore the combination would be written thus: + 3.5 D. cy. ax. 90° ⌔ — 1 D. cy. ax. 180°.

Or it may be written thus: — 1 D. ⊂ + 4.5 D. cy. ax. 90°.

The first transposition would give us crossed cylinders, a + 3.5 cylinder acting in the horizontal, and a — 1 cylinder in the vertical. Lenses ground in this manner are quite expensive, and I think that, unless specially requested to do so, the optician never grinds crossed cylinders, preferring to grind according to the first combination. In the second transposition a — 1 sp. which exerts its influence in both meridians is used. Now in order to get the effect of + 3.5 in the horizontal meridian it is necessary to increase the + glass 1 D., making it + 4.5 D. cy. ax. 90°, 1 D. of which neutralizes the — 1 sp. in the horizontal meridian.

The most complex cases can be worked out in this manner. A simple rule for finding the right angle to any given axis is to add 90° to all meridians below 90° and subtract 90° from all above, thus the right angle to 35° would be 125°; right angle of 165° would be 75°, etc. Supposing now that Presybopia is present, this might still complicate matters, let us see how to add the findings to our first recipe. The patient is forty-two years of age and reads Jaegar 1 at 12 in. with + 1 D.; adding this to the 3.5 D. cy. ax. 90° would make 4.5 D. cy. ax. 90; the + 1 D. added to the — 1 D. cy. ax. 180° would neutralize it, therefore the recipe would be, supposing we wanted the full correction ground together, + 4.5 D. cy. ax. 90°, or we could order an auxiliary glass with + 1 D. lenses. to be worn over the distance glasses.

No. 1016 I Street.

[Opticians prefer to grind (1) + sphericals ⊂ + cylinders.
(2) — sphericals ⊂ — cylinders.
(3) + sphericals ⊂ — (stronger) cylinders.
All + sphericals ⊂ — (weaker) cylinders can be transposed to (1).
All — sphericals ⊂ + (weaker) cylinders can be transposed to (2).
All — sphericals ⊂ + (stronger) cylinders, and all + cylinders ⊂ — (weaker) cylinders, can be transposed to (3).—Ed.]

The Refractionist.

A Journal of Practical Ophthalmology.

FRANCIS F. WHITTIER, M. D., Editor.
74 Boylston Street, Boston.

Original Articles will be paid for in cash or reprints.
All articles for publication should be typewritten if possible.
Address all communications to the Editor.

Errata. Dr. W. S. Dennett of New York, writes: "Will you kindly correct what seems to be a typographical error in the 'Formula for Decentering Lenses' which is attributed to me in the January number of THE REFRACTIONIST. The formula should read $M. = \frac{9 \times P}{D}$, the numerator being $9 \times P$ instead of $9 + P$ as printed."

The doctor also states that he makes no claim to priority in reference to the rule. In fact the rule was attributed to him by us without his knowledge. We have since received the following from Dr. Ward A. Holden of New York:

45 West 39th St., NEW YORK, March 15, '95.

DR. FRANCIS F. WHITTIER, Editor of THE REFRACTIONIST.

Dear Sir:— Apropos of the rule for decentering lenses for prismatic effect attributed to Dr. Dennett, and published in the January number of THE REFRACTIONIST, I beg to call your attention to a paper of mine published in the January number of the *Archives of Ophthalmology* for 1891, on the cylindrical effect of tilted lenses, and the prismatic effect of decentered lenses, in which a similar formula is given. It is there said that the decentering necessary in a given lens to produce a required prismatic effect may be found by multiplying 8.7 mm. by the number of degrees of the prism, and dividing the product by the number of dioptries of the lens. This rule, which is sufficiently accurate for all practical purposes is based upon the supposition that the refractive index of the glass is 1.5.

Yours respectfully, WARD A. HOLDEN.

Both of these gentlemen are original investigators in the ophthalmological world, and we gladly correct any wrong impressions that may have been derived from our statement made in the January number.

Page 162, line 15, read ax. 60° instead of 160°.

Line 28, read Jaeger for Jaegar.

Selections.

Strabismus. All physicians may at times be called upon for an opinion in reference to the convergence of the eyes of their little patients, so I have thought that the suggestions of this paper may be of service to the society;* and since the discussions of the profession in reference to squint are, according to my observations, somewhat uncertain and misleading, I therefore wish, if possible, to correct them from my own clinical experience.

The thoughts contained in this paper were most forcibly suggested to me by the following quotation from Dr. W. B. Johnson's excellent article on Amblyopia from Suppression of the Visual Image, which paper was read before the American Ophthalmological Society in the summer of 1893.

Dr. Johnson says: "The natural tendency of the visual centres is to relieve themselves of the diplopia, which is an offending condition, and relief is attained by a gradual loss of physiological sensibility through psychical exclusion of the vision of one of the eyes. The selected eye may or may not have diminished visual acuteness due to a greater refractive error than the fellow eye, each eye, however, generally having a hypermetropia of a greater or lesser degree, which is almost always present, and is undoubtedly an important ætiological factor in the production of convergent squint."

I have reported his words thus fully, as I find here two very interesting questions to answer: First, Is there, as a rule, loss of physiological sensibility through psychical exclusion of the vision? and, secondly, Is hypermetropia an important factor in the causation of squint?

In discussing this subject I wish to present some views of my own in relation to crossed eyes, from my observations both in private and clinical work; not that they may differ very materially from those previously accepted, but that I may separate the cases of convergent squint, when there is no paresis of the external muscular apparatus, into two great classes—operative or non-operative. In these two divisions we may place all the cases that come under our care and

* Read before the Medical Society of the county of New York.

treatment, thereby deciding the relative value of glasses or of an operation.

There seems to be an impression among the profession that the vision of amblyopic eyes can be restored with binocular fixation under certain conditions. And the question arises, Is this true in all cases, or only in a certain number, or under certain conditions of refraction? It seems to me that if this fact can be established in any one case, then it should hold good in all. In answering this we shall also find the answer to the quotation above stated.

Fuchs, in the last edition of his work, gives the ætiology of squint as follows: "Strabismus is, therefore, the result of the combined action of two factors — diminution of the visual power of one of the eyes and a pre-existing disturbance of the muscular equilibrium. According as the latter factor consists in a preponderance of the internal or the external ocular muscles, a convergent or divergent squint is produced." The same ideas have been advanced by Stilling and also by Swan Burnett, and these I propose to follow in a certain measure to be explained.

Leaving out, then, all pathological conditions and considering these questions as they relate to squint *per se*, as usually seen in the office and at the clinics, let us define the conditions as indicated in our cases.

I would first define amblyopia as an unknown condition occurring generally in the non-developed or hyperopic eye, in which, without any visible evidence of an abnormal condition, there will be a want of power in the retinal elements, either existing in the nerve fibers or its terminal elements in the retina, and by which they can not appreciate small images formed on the retina and thence to be conveyed to the brain.

Consequently there is no fault in the dioptric media, causing diminished visual acuteness due to refractive error, nor is there psychical exclusion of the vision, but that the amblyopia is congenital. Why this condition, as above stated, should occur only in the one eye, and not in the other, I am unable to explain. It is simply a clinical fact. On the other hand, if we do have a condition of perfect visual acuteness in both eyes, but that the rays of light can not be focussed on the retina without excessive accommodation — and by that condition the stimulation of excessive convergence (relative hypermetropia) — then we shall have one eye converging more than its fellow. Now, we have suppression of vision in the squinting eye

that in time will produce diminished vision, due either to a refractive error or to psychical exclusion; but this may be and will be restored as soon as the demand for excessive convergence and accommodation is removed by the correction of any refractive error by glasses.

There can be no diplopia under these conditions, because, while the image is perfect in the fixing eye, the rays from the object must fall upon the peripheral parts of the retina in the squinting eye, there forming only a diffused image that will be suppressed. Again, the rays which fall upon the macula coming from a plane different from that of the object or point to which the dioptric apparatus may be adjusted, these rays can only form a diffuse image that is not conveyed to the visual centres.

Hence there is no stimulation of the physiological functions of the nerve elements at the macula for certain periods of time, and consequently, when at first this function is resumed by the usual tests, the vision will be found reduced, but will be rapidly restored under proper conditions.

In the ætiology of squint I think these explanations may suffice; but is there a disturbance of the muscular equilibrium? Or is the squint due simply to the normal conditions of adduction and abduction? And does not an exception to the rule cause divergent squint?

Let us first divide our cases into two great classes of divisions, according to their observed frequency: First, squint associated with congenital amblyopia, and, secondly, squint due to relative hyperopia, with *temporary* suppression of the visual image.

In these two classes I think we can readily place all our cases of squint, and if so, then the method of treatment, either operative or otherwise, will be readily and clearly indicated from the beginning to the final parallelism or the optic axes. If we take up our first class of cases I think we can at once answer the question as to the ætiology. I do not believe hypermetropia is in any way an ætiological factor in the causation of this squint, though always associated with it.

Let me illustrate this: A child is born of perfectly healthy parents, normal in all respects, the visual axes perfectly parallel, and the power of the external muscles properly proportioned. But there is present a condition of amblyopia that, I believe, is due to a want of development in the retinal elements and not to a central cause, as these amblyopic eyes can appreciate and do know large letters.

Assuming this condition, associated with the normal power of the lateral moving muscles, as proposed in my last paper, The Power of the Interni, in which I claimed that the power of the interni was four times stronger than the externi, and with the "guiding sensation" almost entirely absent from the amblyopia — then, I repeat, assuming these two conditions, we find one eye begins to turn inward at periods ranging from one week to three or four years after birth. Is this not due to the preponderance of normal power in the muscle of adduction. But to proceed, in time the squinting eye becomes fixed, with the cornea toward the inner canthus, and when the child is old enough to answer questions, we find the vision very materially diminished in the convergent eye.

As time goes on the child knows and names its letters properly; then the vision is found to be normal — $\frac{20}{20}$ in the fixing eye, but is only about one tenth, or $\frac{20}{200}$, in the other eye.

Now, if we find the above conditions — the child squinting when only one week old — surely there can be no convergence with accommodation when the eyes are used, yet for all this one eye turns inward. Must not these conditions exist? Do we not have an amblyopia in the squinting eye, or has there been a suppression of any images when at five years of age we find the vision only $\frac{20}{200}$? And waiting five years longer it is still the same, $\frac{20}{200}$. Can anyone claim that there has been a loss of physiological sensibility in the eye to reduce vision from the normal to $\frac{20}{200}$ in the first five years, and yet after that, or in the next five years, there has been no further loss of sensibility, as the vision remains the same? Or may we go still further, and if the child never has an operation the squint remains until the age of thirty years, and then the convergence disappears, the eyes are parallel, and remain so, yet we still find the vision $\frac{20}{200}$? Has all the loss of vision taken place in the first five years and remained stationary.

We have all seen these cases. I have examined many of them, and feel convinced that the perceptive power of the retinal element has been the same since birth, and that there has been no loss of physiological sensibility.

Again, if the vision is reduced in the first five years, the eye ought to suffer still further loss of visual power, and yet we find exactly the reverse in all our cases.

In this class we can surely exclude amblyopia ex-anopsia, and conclude that the child has been born with a retina in which there is loss

of power to perceive retinal impressions for small objects and convey them to the visual centres.

They will not be improved by the use of glasses or by an operation, except in reference to the cosmetic effect.

Granting all this, and associated with it we have the normal power of the straight muscles in adduction and abduction, and taking from the eye its power of fixation or guiding sensation, due to the amblyopia, then in time this eye must turn in the direction of the most powerful muscle—namely, inward—but will again resume its proper position when forced to fix on an object, by cutting off the stimulation to fix in the other eye with a screen, called concomitant squint. This is not a pre-existing disturbance of muscular equilibrium (Fuchs), nor is the squint due to the eyes assuming a position of rest, as advocated by Stilling and Swan Burnett, but rather is due to the normal power of adduction over that of abduction when the retina is deprived of its guiding sensation by amblyopia.

Hence I do not fully accept the views of the writers quoted above, as I believe a position of rest is found when the eyes are directed to a point fifteen feet distant and about fifteen degrees below the horizon; but I assert that the more powerful muscle—the internal rectus—has overcome its antagonist and remains in a condition of tonic contraction, thereby turning the eye inward, or outward, should the preponderence of power be in the external rectus. Since writing the paper I have examined some cases of amblyopia without squint, and have found the externi stronger or equal to the interni.

If we continue the history of our cases still further, the eye turning inward, the internal rectus remains contracted until about the twenty-fifth year, when the convergence disappears. Why? Because the power of the interni has now become so reduced from continued contraction that it equals that of the externi, and the eye resumes its proper position. Now the amblyopic eye will follow its fellow eye, but the vision remains the same as in childhood. We may, then, conclude that those cases under our first class are born with an amblyopic eye, and that the normal power of the internal rectus, deprived of the psychical stimulation of the guiding sensation, is the primal and chief cause of the strabismus. These cases can not be corrected by the use of any glasses, but must be operated upon by a complete tenotomy just as soon as the eyes can be tested in reference to their visual power. Until an operation has been performed, glasses or exclusion of the eye will be simply useless; but after the

operation the glasses may be used to relieve any strain on the accommodation. The hyperopia was not a factor in the causation of this class of strabismus.

Let me now illustrate our second class of cases. We find a child born with normal eyes, both in reference to vision and the power of the straight muscles, but having a hyperopia of two to four dioptries, with possibly weak accommodation. Now, we soon notice that as it begins to play with small toys or use the eyes at the near point, it begins to turn one eye inward at times, called periodic squint. This continues until the child is five or ten years old, when one eye remains constantly turned inward, called fixed squint.

Now, on testing, we find a loss of visual power in the retinal elements, or a loss of "physiological sensibility through psychical exclusion." The vision is naturally diminished in one eye from disuse, the so-called amblyopia ex-anopsia, simply from suppression of the visual images in the visual centres. But not amblyopic, because the retinal sensibility still exists and *will be* readily restored by forcing the squinting eye to be used, by stopping the relative action of accommodation and convergence by atropine, and correcting the refractive error by glasses.

We have here, under these conditions, what Donders first called relative hypermetropia; so let us see how we may explain it more fully.

We know that the centres for accommodation and convergence are very closely associated in the oculo-motor centres, beneath the aqueduct of Sylvius and the floor of the fourth ventricle; and as the child begins to use the eyes to accommodate the vision to a point, say twelve inches distant, it can not overcome or correct its hyperopia. To do this, therefore, the child requires a greater power of accommodation. The stimulation for this condition is conveyed to the cerebral centres, so stimulating the power of convergence by the association of these centres, and by an excessive convergence the child soon learns to see clearly at the distance of twelve inches. In other words, by a convergence of the visual lines to a point six inches distant, the child attains sufficient accommodation to see clearly at twelve inches, and the rays of light from the object will form a clear image in the retina of the fixing eye. Its fellow-eye is now found to have its visual line directed to a point much nearer than the object, or squints inward.

Assuming, and in fact knowing, this to be the condition present, what becomes of the images formed on the retina of the squinting eye? First, the image of the object falls upon the least sensitive parts of the retina — namely, the inner peripheral part, there forming an indistinct image; secondly, the image, whatever it may be, that is formed at the macula, or most sensitive part of the retina, *is not in focus*, the rays coming from a far different plane than the object, and again we have an indistinct image.

Consequently the visual centres will readily suppress these indistinct images formed on the retina, and only single distinct vision is carried to the visual centres. We may now say there is a loss of vision from "physiological sensibility through psychical exclusion" in the squinting eye, but we must remember that the sensitive retinal elements are still the same and may be rapidly developed to their former standard at birth as soon as the eye is again used under proper conditions.

Is this condition amblyopia ex-anopsia, or is it only temporary suppression of the visual image?

Test these cases, when first seen, after they have suppressed the image in the squinting eye for several years, and we will find the vision very much reduced — about $\frac{20}{70}$ or less. Now use a mydriatic, as atropine, to complete paresis of the ciliary muscle, correct the existing error of refraction, and in a few weeks we will soon find a return of the previous normal power to see and the vision becomes $\frac{20}{20}$, or normal. We have corrected the relative hyperopia, the "guiding sensation" re-asserts itself, the squint has disappeared.

The normal muscle balance remains, and in time, should the accommodative power become stronger by the use of glasses, they may be laid aside without a return of the convergence, and an operation has not been necessary to correct the squint.

Under these two classes I feel we can place all our cases of strabismus, putting all pathological conditions in the first class, and by them we can explain all and every phenomena that is observed.

It is well known that persons are born with amblyopic eyes and yet do not squint—both visual lines are properly fixed on the object; they have no asthenopia, no convergence, nor does the vision in the amblyopic eye become better or worse. No; the visual power remains the same through life, yet they do not squint, because in these cases I believe we have an insufficiency of the power of the interni (well shown in a case lately examined) and not the normal

power of the lateral moving muscles, of four to one, so as to cause the amblyopic eye, with its loss of the guiding sensation, to turn inward in the direction of the powerful muscle acting against its weaker antagonist.

In conclusion, if we accept these views we may decide that in the first class amblyopia is simply and positively the cause of the convergence of the visual axis, and not a consequence of that condition; the lesion is ocular and not central, nor can it be restored. That in relative hyperopia we may have a temporary suppression of the visual image, not the so-called *amblyopia ex-anopsia*, and that we may order our treatment of all our cases from a standpoint that will at once be indicated for the correction of this deformity of the position of the eyes.

We will not please ourselves with the idea that we have restored useful, perfect vision in an amblyopic eye, but that in the first class we have corrected a cosmetic deformity by an operation, and in the second class we have restored a dormant physiological sensibility of the retina by the use of atropine and glasses.

I will not detain you with a report of my cases, both in clinical and private practice, that I have observed in the past few years, particularly since I have noted the discussions of the restoration of vision in amblyopic eyes in the medical journals; but I wish to state that a careful study of all my cases and of those reported, when the histories have been at all accurate and complete, have only tended to convince me that the suggestions contained in this paper *are correct* and will bear the closest investigations.

The other evening I was asked by a member of this society when I would operate in a case of strabismus convergens? and I would answer that question simply by stating, first decide to which class the case belongs. If to the first class, then operate at any time—at five years of age is the best—while if to the second class, then you must use the atropine and glasses even at two years of age, as reported by Savage, and you may correct the convergence without an operation in the majority of cases. But this means failing, then you must operate after a fair trial of the glasses for six months. I do not believe we shall ever have a divergence after a careful operation in the first class, while after an operation in the second class, by so altering the normal balance of power, we may have that unfortunate occurrence of the operated eye turning the other way—divergence.

In presenting these views I do not wish it to be understood that there may not be other causes for the production of convergent squint, but we may place under the same conditions as I have shown in the first class all cases that present any pathological conditions in the dioptric apparatus, the retina or vitreous, for in all these cases we may have the normal balance of the lateral moving muscles and the same loss of the guiding sensation that we know must exist in amblyopia.—*Dr. Francis Valk, in N. Y. Medical Journal, Nov. 24, 1894.*

* * *

Abstracts. Dr. A. A. Hubbell in the Buffalo Medical *Journal*, has been giving a valuable series of papers consisting of abstracts and analyses of the papers read at the Eighth International Ophthalmological Congress, held at Edinburgh, last August. The following, relating to refraction, will be of interest to readers of THE REFRACTIONIST.

STEVENS, after a thorough investigation of the relation between accommodation and convergence, has come to conclusions quite at variance with those generally accepted. He holds (1) that there is no essential relation between the two functions, the connection existing incidentally and as the result of habitual association. (2) The proportion of cases of convergent strabismus associated with hypermetropia, and divergent strabismus associated with myopia, has been exaggerated. (3) The cases of strabismus which are relieved by convex or concave spherical glasses are cases of hypertropia or hyperphoria, and the relief obtained is largely due to their action as vertical prisms. (4) His observations have led him to believe that excessive accommodation does not directly cause convergent strabismus.

TSCHERNING, in speaking of the mechanism of accommodation, said that his experiments had demonstrated that the increase of refraction of the eye during accommodation diminishes toward the periphery. At a distance from the axis of 2.5 millimeters the accommodation is only one-half of that at the centre. This is due to the fact that the anterior surface of the lens, during accommodation, becomes pointed. The same change of the lens may be produced in animals by traction on the ciliary zone.

Chibret confirmed the theory of Tscherning.

BULL regarded pressure of the lids upon the cornea as an important factor in causing certain forms of ocular fatigue, which he

calls tarsal asthenopia, and which may be experienced by many persons on reading in bed.

Savage opposed this explanation of the asthenopia caused by reading in the recumbent posture, and referred it to the excessive work which such a position brings upon the inferior recti and superior obliques.

Burnett had found, some years ago, that pressure of the lids caused an astigmatism which he was not able to correct by any cylindrical lens, and that the changes by lid-pressure produced marked changes of the cornea-curve, as shown by the ophthalmometer.

Power cited a case in which, after a blepharoplasty, the new lid so caused increased pressure on the cornea as to produce a high degree of astigmatism.

RISLEY read a most interesting paper giving the results of extended observation and study of ocular inequilibrium. He said there were two groups of anomalies of ocular equilibrium: Congenital anomalies of the eyes, and anomalies of the muscular apparatus. He desired to call attention only to the group in which simple vision is maintained by a constant tension of the eye which suffers from the anomaly. In most cases the correction requisite for the relative insufficiency should be effected gradually and progressively, and in such a manner that the patient in the meantime learns to use his convergence. In absolute insufficiency the only remedy is tenotomy or muscular advancement.

LANDOLT, after twenty years' attention to strabismus, had come to the conclusion that, in its correction, muscular advancement was better than tenotomy. After tenotomy the excursions of the eye are often limited, the caruncle often becomes retracted, the power of the operated muscle weakened and the eye sometimes has the appearance of being more prominent than the other. On the other hand, advancement gives results as good and complete without any of the drawbacks of a tenotomy and it is without danger. For example, there is no risk of over-correction, no insufficiencies, no retraction of the caruncle and no malposition of the eyeball.

In convergent strabismus he preferred to simultaneously advance both external recti muscles and follow the operation by orthoptic exercises. In muscular insufficiencies or slight strabismus a unilateral advancement would be sufficient. In divergent strabismus a tenotomy of the external rectus gives only a metric-angle of correction, while a complete correction may be obtained by advancement of the internal rectus.

It is only in high degrees of strabismus that he combined a tenotomy of the antagonistic muscle with an advancement, and then the tenotomy is done sub-conjunctivally and without further detachment from the surrounding tissues.

Swanzy did not think that simple tenotomy should be discarded in favor of advancement to the extent recommended by Landolt. He believed the rules of von Graefe still hold good. He never used advancement alone, but frequently combined tenotomy with it in extreme cases. He found difficulty in deciding how much of the tendon should be removed to produce the desired effect. He also found that advancement sometimes causes disfigurement by reason of an unpleasant red lump being produced at the point of the new insertion. Does Landolt have any difficulty in securing a flat cicatrix?

Pannas was of the same opinion as Landolt in regard to the superiority of advancement, especially in cases due to paralytic insufficiency. In concomitant strabismus, on the other hand, in which the equilibrium is not disturbed by paralysis or retraction, but by insufficient convergence, tenotomy is more certain. Advocates of advancement admit that it frequently fails to afford relief in the divergent strabismus of myopia. For these reasons he employs advancement merely as an adjuvant to tenotomy in marked divergent and in acute paralytic strabismus.

Roosa had used the method of advancement as a substitute for, or as an adjuvant to, tenotomy in very high degrees of convergent strabismus, or when one or more tenotomies had been performed. But to substitute advancement for tenotomy on account of the danger of diplopia, was to make a change from a slight to a more serious operation. Advancement should not be used as a general substitute for tenotomy. All refractive errors should be corrected.

Gruening, of New York, endeavored to avoid the more serious operation of advancement and obtained very satisfactory results, even in divergent strabismus, by the simple operation of tenotomy.

Stevens said that equality of rotation in all directions must be maintained in order to obtain the best results in strabismus operations and the perfect union of images in all positions. To maintain such equality, relaxation of corresponding muscles must be made. Tenotomy of one muscle and shortening of its opponent of the same eye is inconsistent with this principle. He believed that in most cases of strabismus the defect may be relieved and binocular vision obtained with perfect rotation in all directions by carefully graduated

tenotomies on both eyes, to be repeated after some months. But in every case the various forces are to be regarded.

Landolt replied that the criticisms of his esteemed colleagues proved that they do not examine, treat, operate or follow up their patients as he had done. Not one, for instance, had mentioned the measurements of the excursions of the eyes, or convergence, or of divergence, before or after operation. Yet this should be done. He agreed that great stress should be laid upon the correction of optical defects in the cure of strabismus. Operation is not sufficient to do away with the squint, but is only a step in a long and carefully directed orthoptic line.

THIER had operated on thirty-eight cases of high myopia by discission and absorption of the crystalline lens. He passes the knife through the whole thickness of the lens and the posterior capsule. Rapid swelling of the lens is desired, and if cloudiness and swelling do not develop within eight or ten days he repeats the discission. Young patients are most suitable, but he had operated in one case successfully at forty-eight years of age.

He had operated on thirty-eight patients. In eleven he had operated on both eyes, and in sixteen on one eye. In nearly all a marked improvement of vision had been produced.

FUKALA, in speaking on this same subject, said that he operated by discission and followed this by paracentesis and evacuation of the lens. He operated on all suitable cases under forty years of age, avoiding those affected with chronic choroiditis or detachment of the retina. He was opposed to the immediate extraction of a transparent lens, as he thought it liable to be followed by a dangerous hyperemia of the choroid.

Schmidt-Rimpler (Gottingen) considered it necessary to watch the patients for a long time after one of these operations. In one case, operated by discission on one eye, the myopia had progressed in the same manner in the aphakial eye as in the other, with the development of the same choroidal lesions. From this he concluded that, in young persons, the double operation was preferable.

Pfluger had operated on forty cases with good results. He differed with Thier and Fukala in believing that choroidal changes are not a contra-indication. There are few cases of high myopia without them. He does not dare to divide the lens as deeply as does Thier, for the vitreous humor might pass into the anterior chamber and out through the corneal wound. The tension should be watched after discission, and if it occurs it may be controlled by repeated paracentesis.

SWAN BURNETT defended that system of measuring and designating prisms which made the prism-diopter (P. D.) or the centrad (Cr.) the standard or unit. He suggested as an exponent the sign $\triangle$, instead of that of the degree (°). (See No. 7, vol. I. of THE REFRACTIONIST).

Contents of Volume I.

A few words on Refraction, *G. Melville Black, M.D.*, 1
Anisometropia, *Chas F. Basset, M.D.* 5
EDITORIALS: 8
Greeting; Some words on the Myopia Question; The Quarter Dioptry Cylinder; Refractionists should Protect themselves; The Trial Case.
CLIPPINGS: 15
Ophthalmia Neonatorum; Table showing the Number of Millimetres to Decentre a Spherical Lens in order to add a prism of from 1 degree to 5 degrees; When to Operate for Squint.
BOOK NOTICES, 16

Some Ocular Headaches, *F. D. Greene, M.D.*, 17
A Ball-capped Wand for the rapid examination of the visual field, *J. H. Claiborne, M.D.*, 19
Compound Hyperopic Astigmatism with Relatively Oblique Axes, *M. L. Foster, M.D.*, 20
EDITORIALS: 21
Prescription Writing; Subscriptions; Hints for Patients; Curetting the Cornea.
SELECTIONS: 25
Analysis of Hospital Work; An Improved Cell of Glass and Celluloid for Preservation and Exhibition of Macroscopic Eye-specimens; The Case Book.
BOOK NOTICES, 32

The Modern Eye, with an Analysis of 1300 Errors of Refraction, *W. F. Southard, M. D.* 33
EDITORIALS: 40
Some Words on Refraction Work; Thanks.

The Choice and proper care of Spectacles with Practical Hints as to their Use. *C. R. Gardner, M.D.*, 49
Prescription Writing, *F. D. Green, M.D.*, 57
EDITORIALS: 59
The Eyes in Infancy and Childhood; Headaches; Splendid Sight; School Children's Eyes; Other People's Glasses; Can't Afford it.

With Emmetropia possible in both Eyes what portion of the Ametropia shall we Correct? Casey A. Wood, M.D. 65
What a General Practitioner should know about Diseases of the Eye. R. F. LeMond, M.D. 75
SELECTIONS: 77
Musicians' Eyes; Eye Paralyses:
BOOK NOTICES. 80
REPRINTS. 80

Do Weak Lenses Benefit Patients? Clark W. Hawley, M.D. 81
Detachment of Retina following a Simple Extraction of Cataract. Dunbar Roy, A.M., M.D. 90

SELECTIONS: 92
Obstructive Diseases of the Lachrymal Passages; The Use of Prisms; A New Way of Testing Eyes; Headaches in Childhood; Indications for Enucleation of an Eye.

Do Weak Lenses Benefit Patients? Clark W. Hawley, M.D. 97
The Errors of Refraction Found in Four Thousand Eyes. H. S. Miles, M.D. 104
EDITORIALS: 108
Physicians and Commissions; System; Mutual Help.
SELECTIONS: 111
A Combination Test for Color Vision; Headache.

The New or Dioptral System of Measuring and Designating Prisms Employed in Ophthalmic Practice. Swan M. Burnett, M.D. 113
EDITORIALS: 117
Good Advice; Recurrent Oculo-Motor Paralysis; Spasm of Ciliary Muscle; The Profession; Annals of Ophthalmology and Otology.
SELECTIONS: 121
Description of an Artificial Eye; The Clinic; Chronic Retro-Bulbar Neuritis; Eye Symptoms; Myopia.

Shall Low Grades of Ametropia be Corrected? Maurice F. Pilgrim, M.D. 129
Inspection of the Eyes of School Children. F. F. Whittier, A.M., M.D. 134
An Optician's Case of Anisometropia. C. R. Dufour, Phar. D., M.D. 137
EDITORIALS: 138
Opticians; Patent Medicines.
SELECTIONS: 139
Professional Advertising; What the General Practitioner should know about Diseases of the Eye; Cataract.

Shall Low Grades of Ametropia be corrected? M. F. Pilgrim, M.D. 145
EDITORIALS: 156
Formula for decentering lenses; Universal Trial Frame.
SELECTIONS: The Clinic, 157

A Case in Practice. E. E. Hamilton, M.D., Wichita, Kan. 161
Review of "Diseases of the Eye" (Roosa) W. Oliver Moore, M.D., New York 168
"The Universal Trial Frame." G. Melville Black, M.D., Denver 172
EDITORIALS: 173
The Signs of the Times; Spectacles or Eyeglasses; How do you Suppose he got it? Our Good Intentions; Back Numbers.

A Simple Method of Working out Complex Refraction Cases. C. R. Dufour, M. D. 177
EDITORIALS:—Errata. 179
SELECTIONS: 180
Strabismus; Abstracts.

41
955